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FBI CIO Zalmai Azmi: "If information doesn't get to agents on the street in time, then we haven't done our job properly."

WANTED

Someone to Fix the FBI's IT

The Bureau's fifth CIO in six years tries to be an agent for change and fix the agency's technology-averse culture. Can he do it? Page 42

BY ALLAN HOLMES

WHO KNOWS WHOM, AND WHO KNOWS WHAT
Social network analysis can unlock your hidden information assets.
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HOW TO GET WHAT YOU NEED
A public TV station cajoles a team of vendors into building it a digital asset management system.
Page 58

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The FBI insisted on using mainframes instead of cheaper and more efficient technologies because "the leadership just spent $10 million on a mainframe, and they didn't want it to go to waste," says former modernization project leader **Sherry Higgins**.

COVER PHOTO BY CLAUDIO VAZQUEZ

Change Management

COVER STORY

WHY THE G-MEN AREN'T I.T. MEN | 42

The FBI's new CIO must change the agency's cultural bias against information-sharing and technology before it can become a global intelligence operation truly capable of preventing crime and terrorism.
Feature by Allan Holmes

THE HARD ROAD TO CHANGE | 10

Succeeding as a CIO takes more than technical acumen; you need to understand your enterprise's culture. **Column by Abbie Lundberg**

SPECIAL REPORT: GOVERNMENT I.T. | CIO.COM

Government—both federal and local—seems to have an especially hard time with IT. Read more on bureaucratic deployments, from the IRS's woes to city hall's successes in "Special Report: Government IT." Find the link at **www.cio.com/061505**.

IT Value

VALUE WAKE-UP CALL | 66

Marriott President and COO William Shaw knows the ROI of technology can be hard to pinpoint. So he constantly pushes for better ways to measure IT's contribution. **A "View from the Top" Interview by Christopher Koch**

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As the CIO of GE Real Estate discovered, you can often win more funding and credibility by starting with a few low-cost applications that wow the business side.
Peer to Peer column by Hank Zupnick

BUTTRESSING THE BUSINESS | 36

CIOs should stop trying to achieve buy-in for IT initiatives and start helping business colleagues sell the projects themselves.
Column by Michael Schrage

Knowledge Management

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Employees' personal connections can be as valuable as their individual knowledge base. Social network analysis, or SNA, helps maximize a company's collective smarts.
Feature by Susannah Patton

DO YOUR OWN ANALYSIS | CIO.COM

SNA tools can give companies a starting point or blueprint for how best to proceed with KM initiatives. To see a sample tool, developed by Rob Cross of University of Virginia—and to try out the tool on yourself—go to the online version of the article or to **www.cio.com/061505** for the link.

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Are your employees and customers looking for answers? Enterprise search vendors promise to help you help them. **Essential Technology feature by John Edwards**

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With a mix of promises, concessions and trade-offs, public broadcaster WGBH convinced a bevy of vendors to create a reference architecture for digital asset management. **Feature by Meridith Levinson**

SORTING OUT THE DAM THING | CIO.COM
Digital asset management is a confusing concept. Dave MacCarn, WGBH's chief technologist, shares his PowerPoint presentation of the broadcaster's DAM system. Find it at **www.cio.com/061505**.

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Three CIOs have bucked economic trends and set up training programs for entry-level IT staff. **Feature by Thomas Wailgum**

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Leaders need to think, and you can't do that if you're always on—on call, on duty and on guard. **Column by Patricia Wallington**

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The Hard Road to Change

Succeeding as a CIO takes more than technical or even business acumen; you need to understand your enterprise's culture

There are various reasons for project failure. The most common—and obvious—is lack of project management discipline. The most serious—and hard to rectify—is cultural resistance to change.

It's no secret that the FBI agents don't like to share information, even amongst themselves. It seems to be a deeply ingrained belief at the Bureau that it's easier to close cases when as few people as possible know the details of an investigation. And that may well be true when you're trying to get the goods on goons such as John Gotti and his gang. But it's a recipe for failure when the goal is to preempt a terrorist attack.

You can't change beliefs or behaviors overnight. As much as federal agents may intellectually understand that information sharing in this new global threat scenario is good, it goes against everything they've always believed deep down in their guts. So a big, integrated system for sharing case information may make sense, but it probably *feels* to the G-men like a highway to hell.

It's hard to run a successful IT project in such a resistant environment. "The problem at the FBI appears to be mostly cultural, and that's orders of magnitude harder to correct than a project management problem," says Ken Orr, head of the Ken Orr Institute and a former member of the committee that advised the FBI on its virtual case file project (see our cover story, "Most Wanted: Someone to Fix the FBI's IT," Page 42).

The resistance to sharing information at the FBI has its roots in deep-seated cultural norms that are tied directly to a mission about which most agents feel quite passionate.

The resistance to sharing information at the FBI has its roots in deep-seated cultural norms that are tied directly to a mission about which most agents feel quite passionate. And while it's true that few businesses have such a strong sense of mission that their employees can rally around, culture is a fact of life in all organizations. Any CIO championing change must take culture into account. What beliefs will be challenged by a new way of doing business? What attitudes—and even emotions—must be swayed? Who can best do the swaying? And what key people need to be brought around?

This tale of trial and tribulation at the FBI brings home the fact that succeeding as a CIO takes more than technical or even business acumen. CIO Zalmai Azmi has his work cut out for him, but his chances seem better than his predecessors'. The Bureau has had almost four years to get used to the idea of sharing information, and Director Robert Mueller has set the direction from the top. Let's hope they get it right this time.

Abbie Lundberg

Abbie Lundberg, Editor in Chief
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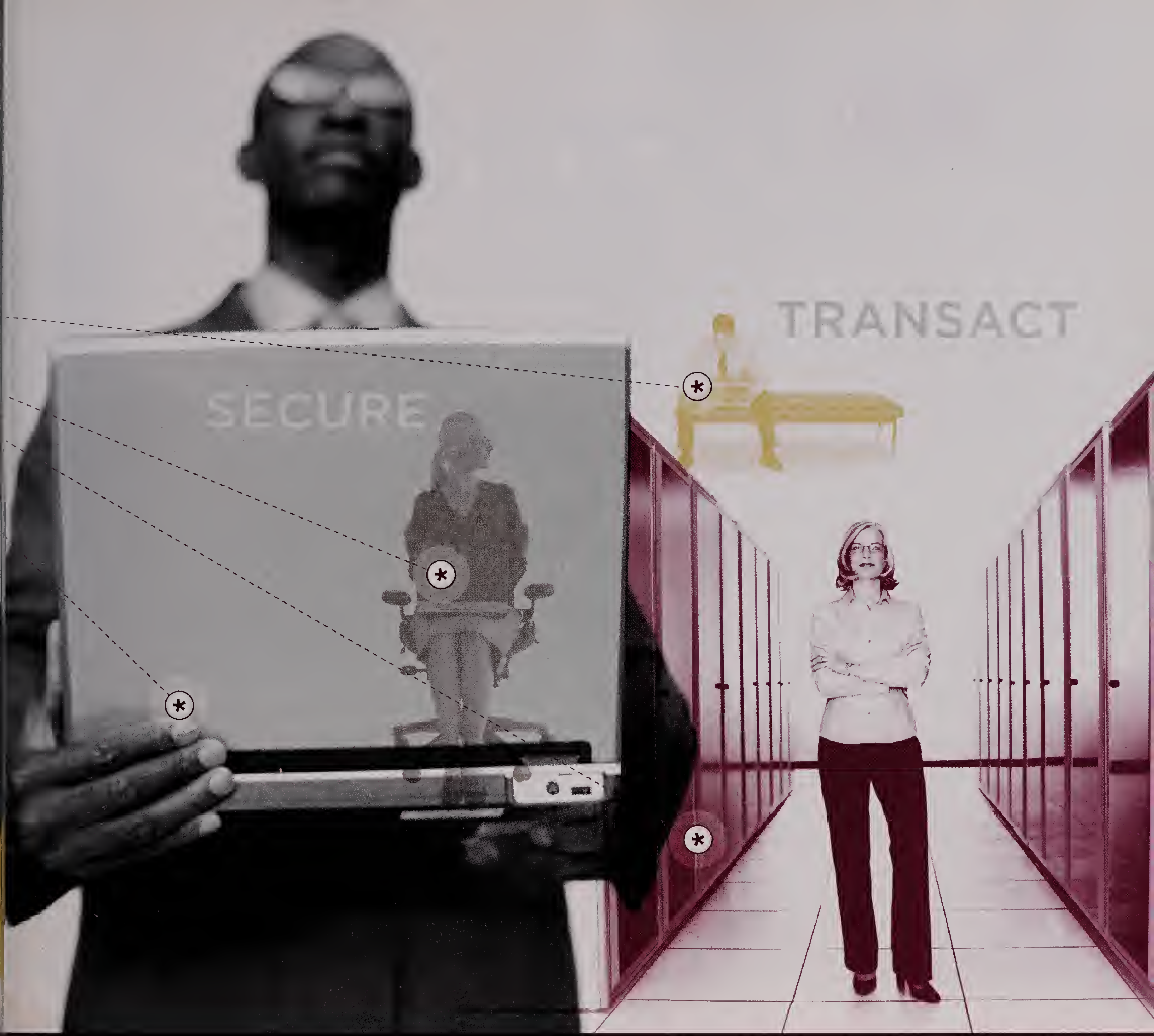

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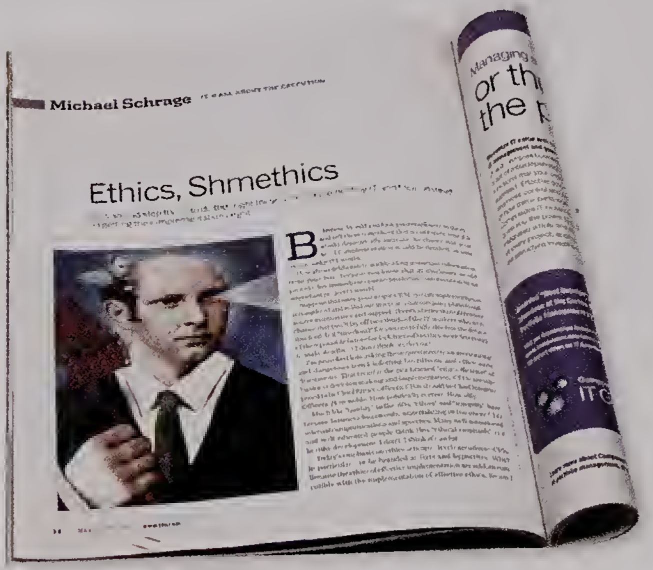
InBox

HOT TOPIC: ETHICS

Michael Schrage's March 15 column, "Ethics, Shmethics," prompted many responses. Schrage introduced the (unpopular) notion that "ethics" and "integrity" have become business buzzwords. Here is a sample of some of the responses. If we piqued your curiosity, be sure to check out other comments and add your own to the online version of the story. Find the link at *www.cio.com/031505*. ***–The Editors***



Michael Schrage

Ethics, Shmethics

Guiding Principle

Mr. Schrage simply espouses a view that is all too prevalent in our country today. Anyone who hasn't been living in a cave for the past few years is aware of the consequences of such actions by leaders of several major companies.

We have three simple guiding principles in my public-sector IT organization. These are trust, respect and integrity. Without integrity, a man or an organization is seriously flawed. I'm happy that Schrage doesn't work for me, and I'm disappointed that *CIO* published such an article!

BILL EZELL
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There are laws and standards for behavior that apply to even the most innocent but demanding IS boss. Businesses have been censured for doing the wrong thing, and there is always the potential for detrimental outcomes that could backfire on the overeager and careless boss.

Shouldn't we try to find that balance between encouraging our people to sustainable levels of quality performance and unsustainable levels of performance that may produce undesired results?

ANONYMOUS

An ethical dilemma arises when it is impossible to avoid doing harm. The resolution of the dilemma then becomes a matter of minimizing the harm that will inevitably result no matter what decisions are made and action taken.

A course of action that results in maximizing benefits for any individual stakeholder or any subset of stakeholders is almost certain to be ethically weak. The ethical course is one that identifies, addresses and protects to the degree possible the most important needs of all parties involved.

RALPH BISHOP
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Ethics cannot be taught or legislated. My personal discovery started at the age of 17, after I had received an acceptance letter to the class of 1970 at West Point.

Soon after my official letter came, I received a letter from the cadet brigade commander. He congratulated me on my acceptance and then explained the Corps of Cadets Honor Code: "A Cadet does not lie, cheat or steal or tolerate those who do." He said if I could live by this code, he would be glad to see me in July 1966, but if I could not, do not show up. Simple, but to the point.

We hold our young officers to a high ethical standard when we know they will be dealing with life and death decisions, but why do we feel that we must, for the good of our project or bottom line, bend or withhold information?

I will trust only those whose personal ethical standards deserve that trust. I have long said, "Trust is hard to earn, easy to lose and almost impossible to regain." Consider me naive if you have to, but I will always live by a code that is much higher than what was suggested by this article.

BOB GINN
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A Different Perspective

I find it interesting that everyone responding to this article is appalled by its message. I'm shocked to be in the minority. I agree with the author.

For project managers tasked with delivering projects at large organizations, ethics, as described in the article, have to take a back seat to budgets and schedules. I consider myself an ethical IT professional, but the examples of headcount reduction and letting team members go at the end of a project are not unethical. At the end of the day, IT is a business.

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What Do You Think?

Send your thoughts and feedback to **letters@cio.com**. Letters may be edited for length or clarity. For a link to the article mentioned, go to **www.cio.com/031505**.

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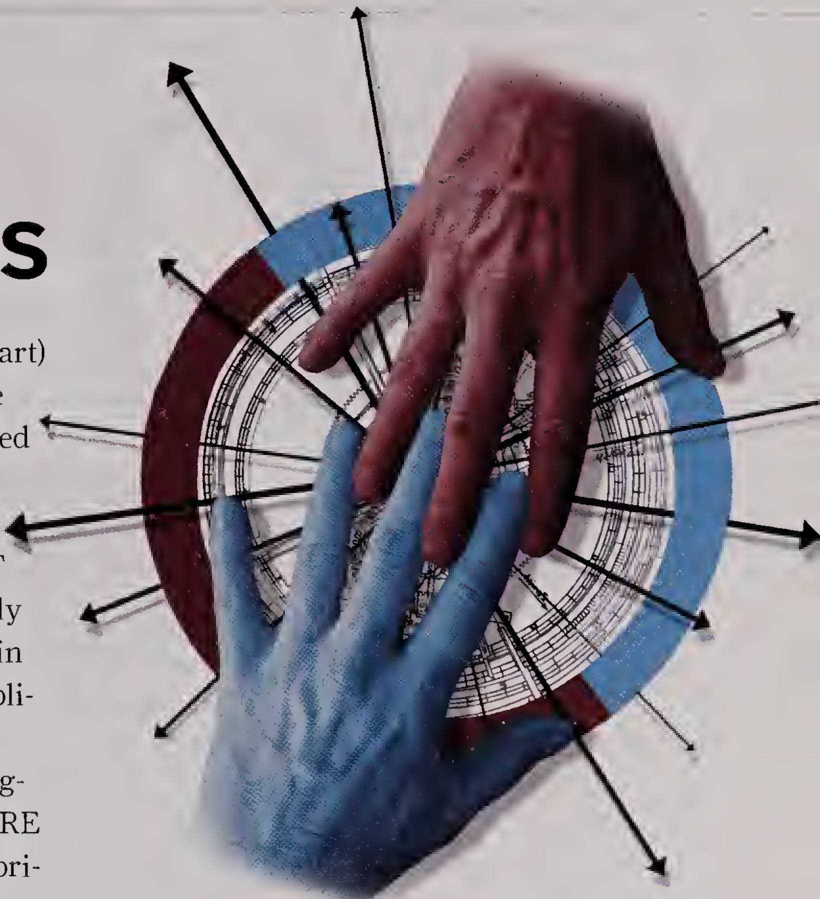
NEW * HOT * UNEXPECTED



B2B Retail Hubs Join Forces

E-COMMERCE When the dotcom bubble burst five years ago, many business-to-business online marketplaces flamed out like so many bottle rockets. Now two of the survivors—retailing exchanges GlobalNetXchange (GNX) and the WorldWide Retail Exchange (WWRE)—have decided to pool their resources, announcing a merger in April.

Gartner Research Director Andrew White suggests that the merger should have happened earlier. "It's really two companies admitting what they should have all along," he says—that their efforts overlapped.

GNX and WWRE were formed separately in 2000 by different groups of retailers interested in streamlining their procurement processes and supply chains. GNX, founded by eight companies—including Sears (which is now merged with Kmart) and Kroger—today counts Ace Hardware among its customers. WWRE was founded by 17 retailers, including Target and Best Buy. While each consortium developed unique product lines, both also offered IT tools to help retailers improve their supply chain efficiency and hosted auction sites in which retailers could negotiate with suppliers for goods and services.

While some other B2B exchanges struggled in recent years, both GNX and WWRE reported profits last year. Neither of the privately held companies provided details.

By merging, the two groups hope to set standards for how information technology is used by retailers, says Joe Laughlin, CEO of GNX and of the new company, which at press time did not have a name. The two companies will combine their technology into a single platform that connects retailers, manufacturers and their trading partners. The new company also plans to reduce

Continued on Page 20

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Speed Dating for Startup Dollars

VENTURE CAPITAL
If watching software executives sweat is your idea of a good time, the Massachusetts Software Council (MSC) has a conference for you.

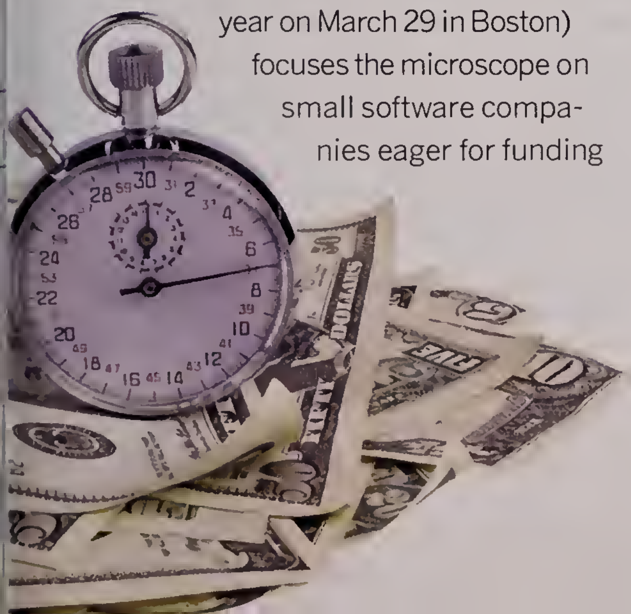
The industry group's annual Investment Conference for Private Companies (held this year on March 29 in Boston) focuses the microscope on small software companies eager for funding from an attentive audience of venture capitalists. The action starts fast. Each software exec gets a mere 30 seconds at the center-stage microphone to convince the investors to attend 10-minute presentations later in the morning. The execs hope to generate enough interest for further meetings—and maybe even a check. It's a pressure-cooker environment that quickly separates entrepreneurs with a focused vision—and no fear of public speaking—from those that need a few more months polishing their elevator pitch.

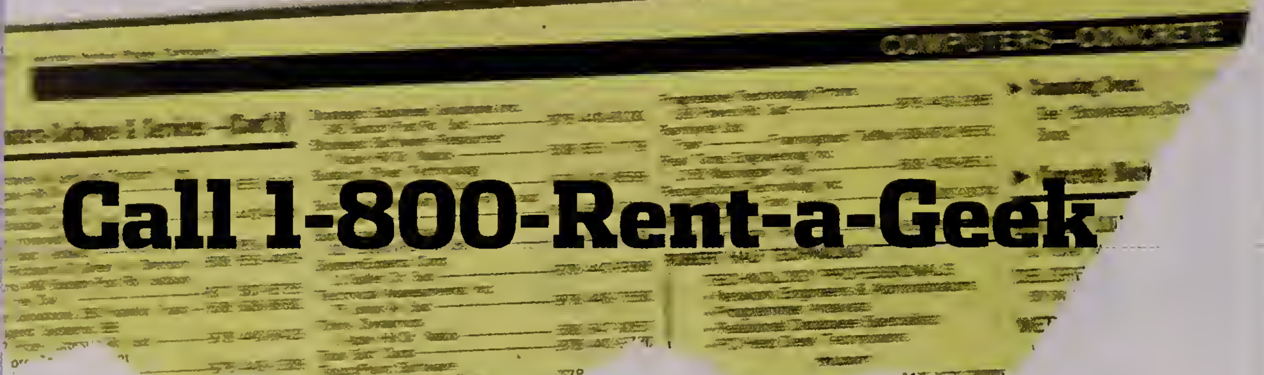
This year, 22 companies, ranging from the vendor of a business intelligence application aimed at senior executives (Optimum Outcomes) to a startup trying to revolutionize Internet radio (Ressen Design), vied for the attention of some 75 investors. Vendor execs ranged from hired-gun CEOs showing off their latest startup to technologists hoping to take their life's work to the masses.

Venture capitalists say the format provides an exceptionally quick overview of where software innovation may be headed in the near future. "Ten minutes is all you need to get a feel for the entrepreneur and the opportunity to determine whether it makes sense to dig deeper," said attendee Austin Scee, a senior associate at Advanced Technology Ventures.

For IT people, attending such an event enables a quick look at technologies that could prove valuable to their companies, either for IT or investment purposes. The MSC says that anyone willing to pony up the $350 registration fee is welcome. Similar events are sponsored by numerous venture capital firms as well as by the Southern California Software Council and FundingPost, which organizes more than a dozen events across the United States each year.

–Christopher Lindquist





Call 1-800-Rent-a-Geek

OUTSOURCING When David Born got the news late one fall afternoon that he was to be the only person left in the IS department of Smith Equipment, a 125-employee torch manufacturing company in Watertown, S.D., he had a lot to worry about. His two colleagues were let go the next day. "My immediate needs were in the security area," explains Born. "When we lost our network admin, that knowledge walked out the door with him."

Born called the local franchise of Expetec, a provider of onsite IT services that had previously helped the company set up its Unix server. A technician showed up the next morning and began securing the network. Born has called him back many more times for other projects. The only other option in town—a traditional IT consultancy—would cost him twice as much as Expetec's $50 an hour rate.

IT managers in small to midsize businesses are employing on-call IT service providers such as Expetec (which has 200 locations in 30 states) to do everything from setting up Web services to installing their phones. When the economy slowed, business for such service providers picked up as companies who could no longer afford to keep full-time IT staff in-house sought external, part-time alternatives. In fact, Expetec says some displaced IT workers have become franchise owners. Similar companies, such as Geeks on Call and Computer Troubleshooters, have set up shop across the country to offer occasional and local IT help to a range of businesspeople, from those lacking expertise in a particular area (such as Born) to those with no technology skills at all.

Jennifer M. Settle, a co-regional vice president with HelmsBriscoe, a conference resource company, uses IT talent from ComputerRepair.com to service her three-person office in Coronado, Calif. She says she finds the service even better than when she worked in a large corporation and dealt with an in-house IT department. "They've been reliable, fast and knowledgeable."

–Stephanie Overby

You Can't Bank on Trust

PRIVACY Trust is critical to generating customer loyalty in online banking. But with every phishing attack and e-mail scam, consumer confidence crumbles, bit by bit. A recent survey by the Ponemon Institute found that consumers with a high level of trust in their primary bank are loyal: **55%** of them say that they never visit another bank's website. However, among these same consumers, **37%** would take their business elsewhere if there was just one privacy breach, while another **41%** would stay with their bank but cease online banking. Banks should also be careful about sending e-mails to their customers: Only **21%** of respondents said that an e-mail from their bank is "always" or "most of the time" information they want to receive. That doesn't sound too trustworthy.

–Thomas Wailgum

B2B Retail Hubs

Continued from Page 19

costs to their customers through economies of scale.

Joe Laughlin,
CEO of GNX

In 1999 and 2000, companies within the same industry—often an industry's biggest players—formed joint ventures called B2B marketplaces or trading exchanges to develop a technology platform for interacting with suppliers or customers. Members would pay a fee to use its services and be able to buy, sell and even design products with multiple trading partners. One popular feature of many B2B exchanges was the auction or reverse auction, in which sellers would offer products to the highest bidder, or buyers would seek low bids for raw materials, parts or finished products.

The competition between exchanges was driven partly by fear of an eBay-like monopoly in each industry and partly by greed for "dotcom-like financial killings," says Andrew Bartels, vice president and research analyst with Forrester Research. But "none of these things really panned out," he adds. Many exchanges also stumbled because their products competed with packages offered by big-name software vendors, and because midsize companies that could benefit from the exchanges were slow to join them.

While other B2B exchanges, like the metal industry's Quadrem, survive on their own, Bartels expects more consolidation among B2B groups that have carved out modest successes with specialized technology. He expects some exchanges to sell out to vendors who can profit by offering hosted procurement, hosted sourcing and global data synchronization products.

In the proposed merger between GNX and WWRE, there is likely to be little immediate impact on customers. What happens over the long term is less clear.

White notes that GNX, with no real competitors among its founding members, has been more innovative. It may be tougher to develop new services quickly after the merger because WWRE members are less willing to share strategic ideas with each other. WWRE is "full of mortal enemies," he says.

–Grant Gross

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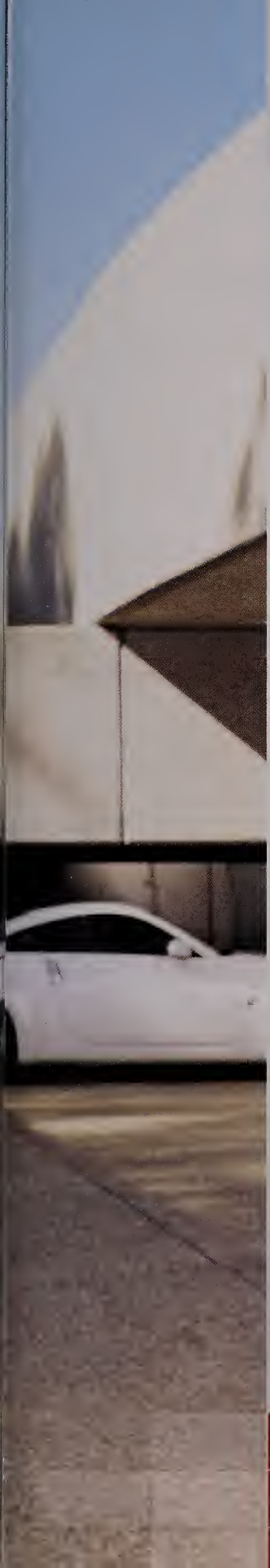

"At Nissan, we expect to save at least $135 million annually thanks to the efficiencies that Windows Server 2003 and Exchange Server 2003 are helping us achieve."

Toshihiko Suda
Senior Manager, *Nissan Motor Company, Ltd.*

Make a name for yourself with Windows Server System. An upgrade to Microsoft Windows Server System made it possible for 50,000 worldwide employees at Nissan Motor Company to have more secure remote access to their e-mail and calendars from any Internet connection, without the hassle and expense of a VPN. Here's how: By deploying Windows Server 2003 and Exchange 2003, not only did Nissan IT meet the CEO's demand for better global collaboration, they expect to save at least $135 million by streamlining their messaging infrastructure. To get the full Nissan story or find a Microsoft Certified Partner, go to **microsoft.com/wssystem**

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BY **JON SURMACZ**

Compliance Begins with the Budget

Companies earmark funds to meet mandates, spend most on personnel

COMPANIES ARE SPENDING billions on regulatory compliance, and a recent report by AMR Research suggests that smart budgeting can help CIOs get the most from their compliance investments. AMR estimates that companies will spend $15.5 billion in 2005 to comply with federal regulations such as Sarbanes-Oxley and the Health Insurance Portability and Accountability Act, as well as other mandates by agencies including the Securities and Exchange Commission and the Food and Drug Administration. Such spending could reach $80 billion by 2009.

The good news is that compliance spending doesn't have to cannibalize the IT budget. According to AMR analyst John Hagerty, more companies are choosing to pool money from other departments (operations, finance and so on) into a dedicated budget for compliance. These budgets take the form of a general pot of money, or one for each compliance initiative. This year, 40 percent of survey respondents had this type of dedicated compliance budget, up from 35 percent in 2004, although 15 percent of respondents said they funded compliance through a general IT budget.

AMR also looked at how companies are spending their compliance dollars. Survey respondents reported that although they are making significant technology investments, labor (by IT and non-IT personnel), consulting and auditing make up almost two-thirds of compliance spending. Hagerty says that it's typical for companies to spend more on consulting and less on technology in the beginning, then increase tech spending later on.

Spending on labor will decrease eventually, Hagerty says, as new business processes mature and companies begin to realize efficiencies through technology. But for relatively new regulations, such as Sarbanes-Oxley, labor will continue to consume a large portion of the budget.

> Companies will spend an estimated **$15.5 billion** on compliance this year, a figure that may rise to **$80 billion** by 2009.

[BEST PRACTICES: BUDGETING FOR COMPLIANCE]

[1]

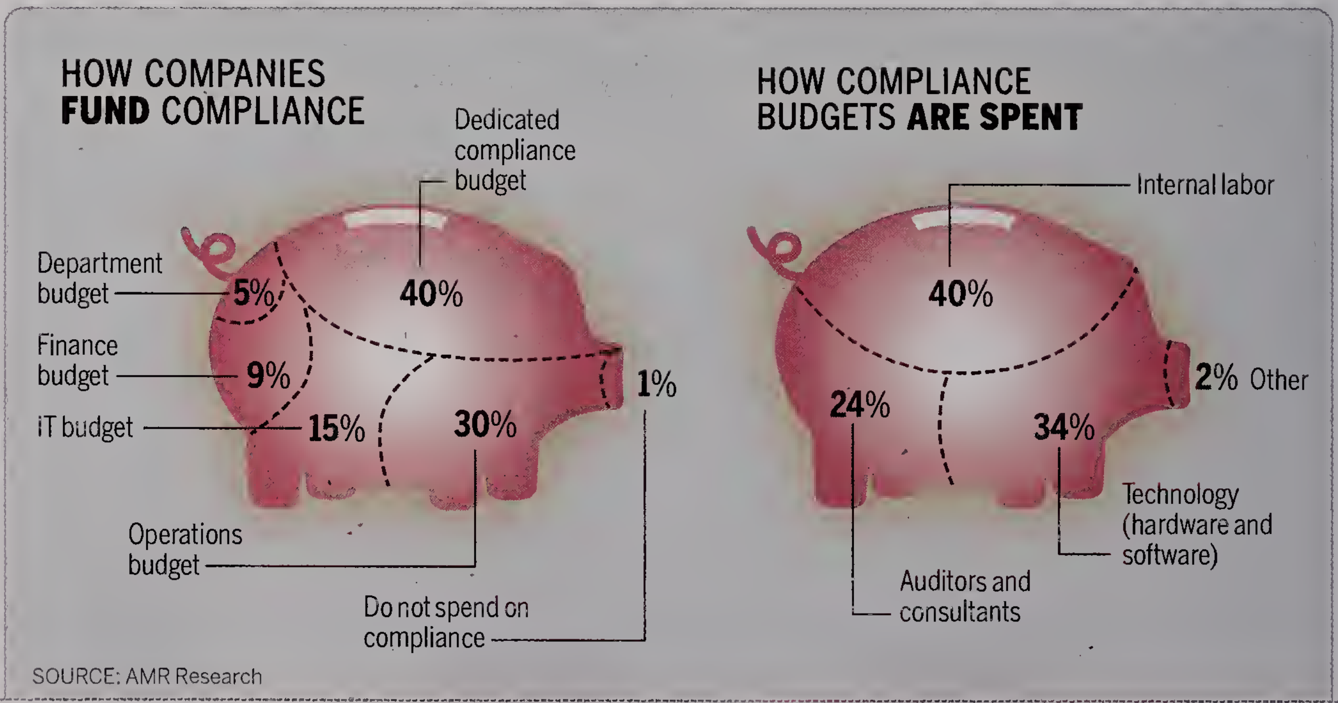
Recognize that compliance is a cost of doing business. Therefore, it should be viewed as part of IT's project portfolio, and CIOs should plan for it like other business initiatives.

[2]

Consider redeployment of existing systems as an option instead of purchasing new technology. AMR analyst John Hagerty says that CIOs should investigate their current systems to see if they already have applications that can be tweaked to fill their compliance needs.

[3]

See the big picture. There may be opportunities to dovetail compliance initiatives with other business initiatives. Hagerty suggests that information security may be one such area.


HOW COMPANIES **FUND** COMPLIANCE

HOW COMPLIANCE BUDGETS **ARE SPENT**

SOURCE: AMR Research

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Reaping Benefits of Enterprise Mobility

At the Edge

PepsiCo gets it. HealthWyse does, too. And so does BNSF Railway.

These companies know what many enterprises are discovering—that while the value of electronic corporate data can be nearly limitless, it's worth nothing if employees can't access it. The fact is, work doesn't always get done at an office desk, and the ability to connect remote workers to the information they need to do their job provides limitless opportunity for ROI.

These industry leaders are at the vanguard of a movement that is quickly gaining momentum worldwide. According to IDC, more than two-thirds of the U.S. workforce will be mobile by 2006. Not surprisingly, mobile implementations are on the rise, as enterprise workers demand access to corporate data anytime, anywhere. Among the most popular areas for mobile business applications:

- **Field force automation**, where mobile workers need access to real-time data, both to do their jobs more efficiently and to serve customers better.
- **Sales force automation**, as the applications allow sales reps to improve productivity in sales rather than waste time on paperwork.
- **Healthcare**, where critical medical information is more available and accessible.

As the following business profiles show, enterprise mobility strategies have moved far beyond more rudimentary applications. Clearly, there's a business benefit to building a mobile strategy. These leaders can offer some insight as to how it's done.

CIO
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CASE STUDY

BNSF RAILWAY COMPANY:

On the Right Track to the Information Edge

Imagine managing a 24/7 production line that's 49,000 miles long, runs outdoors, and spans 28 states and two Canadian provinces.

That's the challenge that faced BNSF Railway Company, a 155-year-old long-haul railroad with 2004 revenues of almost $11 billion. And it helps explain why the company views information technology as a strategic differentiator. "Our rail line is our production line," explains Greg Fox, BNSF vice president of engineering. "It's a complex system, and technology is critical to managing the complexity. We couldn't do what we do without it."

Fox's view particularly applies to the business value of mobile technology, as BNSF has mobilized vital productivity applications for the 6,000 field workers who keep BNSF's track infrastructure in top working order. The result has revolutionized how these workers get their jobs done. Talk to BNSF roadmaster Cotton Smith, whose track crew covers a 194-mile-long subdivision, and it's easy to see why.

"Before we got the notebook computers, I had to drive in to the office daily to do my reporting and planning," he recalls. "That required a lot of driving and a lot of time in the office gathering data, catching up on email and downloading the notes I made on paper when I was out on the track."

Today, instead of driving to the office to gather relevant data, printing it out and driving to the work site, Smith uses a graphically oriented portal that pulls the needed information together and pushes it to the notebook. He also uses his notebook to access electronic work orders in a more timely fashion, and he can document his work while trackside.

"This mobilized solution was about empowering our workers, giving them trackside access to critical information they need to do their jobs," says CIO and vice president of technology services Jeff Campbell. "It allows them to receive near real-time data so they can react better, do their jobs more efficiently and interact more effectively with our dispatchers. As a result, our train flows are smoother and more reliable than we've ever had before. These are just tremendous advantages for our company."

To remain connected, workers use Cisco 802.11b hotspots at the office, in railyards and at high traffic areas of the territory, and Cingular's nationwide EDGE network wireless coverage for access in more remote areas, with the company's own microwave towers serving as the backbone in many cases. BNSF's mobilized solution uses Intel® Centrino™ mobile technology-based notebooks to run the applications. Other solution elements include Sybase iAnywhere offline database and synchronization functionality and mobile device management. The Sybase iAnywhere synchronization server runs on Intel-processor based servers and interfaces with back-end database systems.

"Now, my desk is basically 194 miles long—as long as my territory," Smith reports. "I can do my office work at any location in my territory instead of going back to my office at the end of the day. There's little lag time between when I learn something and when I can pass the information on to the person who needs it." The upshot is that Smith and his team have an extra hour or two each day to spend on the work they love, rather than on administrative tasks.

Meanwhile, mobile and wireless computing are changing BNSF and the industry, according to Campbell. "Mobility is transforming global business and driving us toward what we call the e-synchronous railroad," he says. "It's giving us a collaborative, connected workforce that allows for near-real-time action and reaction, whether that be with customers, suppliers or freight movements. Our workers are constantly on the move, and wireless enables them to be far more productive. I believe mobility will be a key driver of transforming the way we do applications over the next five years." ■

For more information, go to
http://domains.cio.com/infoedge

Company: BNSF Railway Co.
Headquarters: Fort Worth, Texas
Revenue: Almost $11 billion
History: 155 years old; 49,000 miles of track in 28 states and two Canadian provinces
Project Nutshell: By mobilizing key applications for the 6,000 field force workers who keep BNSF Railway tracks running in top working order, mobile workers can now instantly access vital information such as technical manuals and service histories and other materials. They also access electronic work orders via mobile technology, and can document work while in the field.
Technology Profile: Toshiba notebooks equipped with Intel Centrino mobile technology
Cingular Wireless EDGE network
Sybase iAnywhere mobile technologies including SQL Anywhere, MobiLink and mobile device management software
Cisco 802.11b hotspots

"Now, my desk is basically 194 miles long—as long as my territory."
— Cotton Smith, BNSF roadmaster

HEALTHWYSE:
Improving Connectivity—and Health Care

Health care companies face pressure on all sides to cut costs and increase worker efficiency, but they cannot compromise their ability to provide stellar patient care. Ingenious health care businesses turn to mobile technology to help them work smarter, more efficiently, and even improve their quality of service.

Take the case of HealthWyse, a Reading, Mass.-based company that provides integrated information systems service to home health providers, from point-of-care applications all the way through to financial applications such as billing.

> Industry leaders such as PepsiCo, BNSF Railway and HealthWyse are at the vanguard of a movement that is quickly gaining momentum worldwide.

Increasingly, home health care is being billed as an alternative to expensive nursing home and hospital care, particularly as insurance companies search for ways to provide care under the fixed fees paid by Medicare, the single largest payor in this business.

In fact, nurses and other skilled home health care givers, already stretched thin to serve an aging population, must now take on another role—that of businessperson.

According to Andrew Braunstein, CTO of HealthWyse, all of this adds up to a lot of paperwork for nurses and home health care workers, as they struggle with medical histories, insurance coverage information, medications histories, etc.

"Home health care is an information-based business," Braunstein says. "Workers spend as much as half their time doing paperwork. Nurses are expensive, and that's a waste of time and money."

The company uses mobile technology to automate much of the paper-based administrative work that slows home health care workers—and cuts down on their ability to serve more patients better. The application, which resides on Intel® Mobile Media Technology-based handheld PDA devices, provides bedside access to patient histories, 40,000 medications, drug interaction comparisons, and "smart" forms that automate much of a nurses' work.

Clinicians at Caritas Home Care, which has run HealthWyse solutions for several years, praise both the wealth of information and the ease of use of the application. According to Pat Fitzpatrick, a nurse at CHC, "Information is just there—the clinician who admitted the patient, and the referral information. You feel better equipped when you go see the patient."

The solution prompts nurses to complete forms and make necessary calls, and nurses fill out an electronic time sheet that goes directly to the billing system. That compresses the billing lag from days to hours, and helps eliminate the need for many data entry clerks—another opportunity for cost savings. A batch of claims that took six days to process now takes one hour. The result: Receivables at CHC are down from 90 days to 30 days. It also improves security, a big concern in an industry that must comply with HIPAA.

Most HealthWyse customers use handheld PDAs, tablets and laptops equipped with both wireless and wired synchronization capabilities. HealthWyse uses Sybase iAnywhere mobile technologies, specifically SQL Anywhere database and synchronization, to integrate and mobilize the reams of clinical and financial information needed by home care providers. "The home health care agencies we work with may range from a couple of end users to many hundreds, making SQL Anywhere's scalability extremely important," says Braunstein. ■

Company: HealthWyse
Headquarters: Reading, Mass.
Revenue: Privately owned
History: HealthWyse offers point of care solutions to more than 2000 home health users, letting them concentrate on what they do best—care for their patients.
Project Nutshell: HealthWyse provides home healthcare agencies with customized information services designed for use with a mobile handheld PDA. The company's services eliminate data entry, reduce non-billable episodes and improve time to submit claims while improving the accuracy and availability of clinical information.
Technology Profile:
Handheld PDA devices, tablet PC and Laptops
Wireless and wired synchronization capabilities
Sybase iAnywhere mobile technology including SQL Anywhere database and synchronization technology

"Home health care is an information-based business. Workers spend as much as half their time doing paperwork."
— *Andrew Braunstein, CTO, HealthWyse*

For more information, go to
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CASE STUDY

PEPSICO:

Exploring New Mobile Options

As the world's leader in convenient foods and beverages, PepsiCo knows the value of data on the road. Its sales and delivery people service thousands of sales outlets, from mass merchandisers to supermarkets, convenience stores to mom-and-pop grocers, making sure that consumers have their pick of PepsiCo products, which also include Frito-Lay brand snacks, Tropicana juices and Gatorade sports drinks. That's a lot of sales and fulfillment information to track, and PepsiCo has turned to mobile technology to help.

PepsiCo's sales and delivery force uses PDAs based on Intel® Mobile Media Technology, which contains vital sales and delivery information, mobilized for use in the field. These applications have replaced cumbersome, costly and error-prone paper-based processes such as order entry with applications that can communicate directly with back-office systems. PepsiCo workers can access such vital information as route management information, real-time demand forecasting, inventory management, promotional information and even training materials right on a lightweight handheld device. Armed with a wealth of intelligence on individual customer accounts and progress against sales plans, sales reps can draw on data to work smarter and sell more products.

However, the company faces an end-of-day bottleneck, as sales reps download their daily figures and data from the handheld to the back office.

"You have to sync and send daily sales, and it takes time, because of the time limitation as everybody rushes to meet deadlines," says Julius Akinyemi, director of emerging technology at PepsiCo. "We might miss sales opportunities because people have to get to a connection to hit their daily deadlines."

The bottleneck then affects fulfillment, as personnel must rush to fill trucks based on orders all pouring in at once. As part of a process improvement strategy, the company is in the initial stages of a pilot that relies on Cingular's nationwide wireless data coverage to allow sales reps to transmit order information as they take the order, rather than waiting until the end of the day.

"We want to take advantage of wireless to sync on the air and send data immediately instead of at the end of the day," Akinyemi says.

The application will extend to delivery personnel as well, enabling them to respond to customer change orders on the fly, and keep the supply chain up to date and responsive. "If a customer changes an order or needs more, we want to be able to correct that order and provide good quality service," says Akinyemi.

The project represents an important step toward a real-time supply chain, giving the company the ability to see what's happening, and act on that information immediately. "By compiling orders on a more timely basis," Akinyemi says, "we can fulfill them more quickly and can perform better for our customers."

PepsiCo is running a pilot program in one region already, and as soon as the process review for that program is finished, Akinyemi expects the deployment to expand. "When we are done, we expect all of our sales and delivery people to use it eventually. It can make a big impact." ■

Company: PepsiCo
Headquarters: Purchase, N.Y.
Revenue: $29 billion
History: PepsiCo is a world leader in convenient foods and beverages, with 153,000 employees. The company consists of Frito-Lay North America, PepsiCo Beverages North America, PepsiCo International and Quaker Foods North America. PepsiCo brands are available in nearly 200 countries and territories and generate sales at the retail level of about $78 billion.
Project Nutshell: PepsiCo is taking the mobilization of its sales and delivery force one step further, adding the immediacy of nationwide wireless data coverage to its mobile sales technology
Technology Profile:
Handheld PDA devices
Cingular Wireless nationwide EDGE/GPRS network

> "We want to take advantage of wireless to sync on the air and send data immediately instead of at the end of the day."
> *— Julius Akinyemi, director of emerging technology, PepsiCo*

Learn How Others Have Created an Information Edge

Visit http://domains.cio.com/infoedge for case studies, white papers, news and analysis. Be sure to check out the interactive webcast featuring Cox Communications' Al Briggs, HealthWyse's Andrew Braunstein and PepsiCo's Julius Akinyemi in a discussion about the mobile enterprise strategies and solutions they deployed—and the tangible business benefits they attained.

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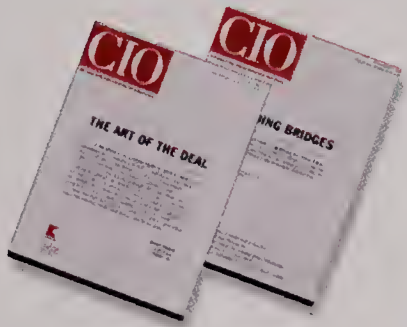

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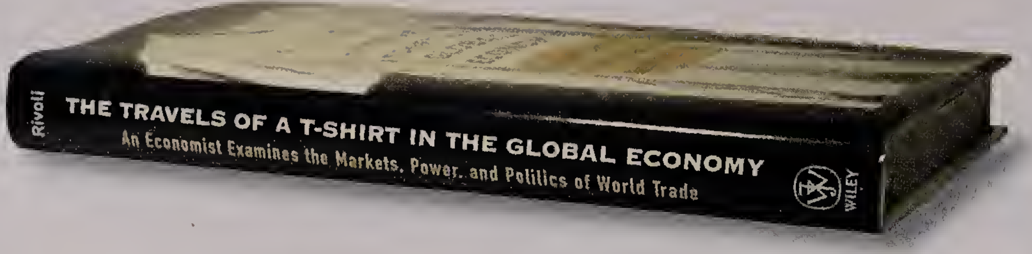

Rivoli
THE TRAVELS OF A T-SHIRT IN THE GLOBAL ECONOMY
An Economist Examines the Markets, Power, and Politics of World Trade
WILEY

The Travels of a T-Shirt in the Global Economy: An Economist Examines the Markets, Power, and Politics of World Trade
By Pietra Rivoli
John Wiley & Sons, 2005, $29.95

Traveling the Supply Chain

A T-shirt takes a writer on a trip around the world

BOOK REVIEW Rarely is a business book so well written that one would gladly stay up all night to finish it. Pietra Rivoli's *The Travels of a T-Shirt in the Global Economy* is just such a page-turner, however.

It begins with Rivoli, an associate professor at Georgetown University's McDonough School of Business, attending a protest against global working conditions. A young woman confronts the crowd with a question: "Who made your T-shirt?" She intends to provoke guilt—or action—among her audience when she asks whether the shirts they're wearing could have been made by Vietnamese children chained to sewing machines.

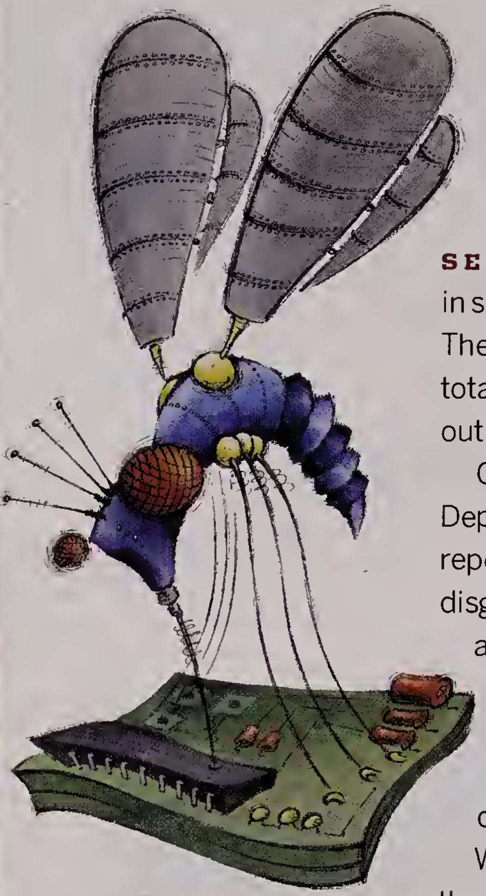
Taking the question as a call to arms, Rivoli sets out on a quest to discover not just who manufactures T-shirts but also who's involved in each step of the supply chain. Tracing the life of a T-shirt from raw materials to finished product might sound gimmicky, but Rivoli uses the device to gracefully uncover a story of world trade and market dynamics.

To get to the beginning, she starts near the end. Rivoli plucks a random T-shirt from a Florida Walgreens bargain bin. She tracks down the screen printer in Miami to find out where he got the blank shirt. That information leads her to Patrick Xu of Shanghai Knitwear. Xu strips away the first of many author (and probably reader) misconceptions, when he tells her where the cotton he uses came from: Texas.

Each stop on Rivoli's travels brings surprises. In the story she weaves, social problems stem not from free market conditions, but from the avoidance of them; farm subsidies and importer tax breaks result in lower wages in poorer countries.

Rivoli says she wrote this book to tell a story. However, she's not entirely without an opinion. Like it or not, she writes, the trade skeptics and the corporations need each other, while the Asian sweatshop worker and the African cotton farmer need them both. To get a full understanding of just why that is, grab this book.

–Stephanie Overby



THE HIGH COSTS OF **HACKING**

SECURITY One fixture of computer break-in stories is the estimated cost of these crimes. The price often runs as high as seven figures—totals hard to ken for merely pilfering the digits out of a few boxes of metal, plastic and silicon.

One source of these high figures is the Department of Justice. Last year, the agency reported that a one-night hacking spree by a disgruntled ex-employee set back Cyber City, a computer network consultancy, more than $100,000—and that Acxiom, a data broker, spent more than $7 million to repair 139 remote attacks against its database by a hacker in Boca Raton, Fla. Warehouses have burned to cinders, and the damage has been valued at less. So are these figures hype?

While it's true that not all network mischief comes at such a high price, John Sgromolo, lead investigator for digital forensics at Verizon Communications and a former special agent with the United States Naval Criminal Investigative Service, says that such large sums are the real deal. More or less.

Consider cases in which a hacker brings down a server that's used for selling products. "If you're averaging $3,000 an hour on this server, that's not hard to figure out based on how many hours it was down," Sgromolo says. Then there's the cost of replacing damaged equipment and the hours spent on repairs, installation and recovery.

Nevertheless, he admits, these estimates "are fueled by another concern: criminal prosecution, including amounts for fines and restitution." Prosecutors tend to aim high, he says, while defendants argue for dismissing some of the costs.

Even crimes that don't result in lost revenue can rack up significant bills. According to The Associated Press, the University of Texas spent $167,000 to mop up the mess presumably left by one of its former students, Christopher Andrew Phillips, who was indicted last November for breaking into UT's student records early in 2003. Phillips allegedly hauled off the identities of more than 37,000 students, faculty and staff.

Student records may not have a lot of financial value, Sgromolo explains, but those records may need to be recreated. In addition, the university may have had to hustle to inform the victims, possibly requiring extra staff and overtime charges. UT officials weren't available for comment.

In sum, there can be more value floating around inside those Internet-wired boxes than in a Brink's safe. Therefore, it's more important than ever for businesses to make sure their digital property is locked up tight.

–Michael Jackman

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Start Small, Think Big

As the CIO of GE Real Estate discovered, you can often win more funding and credibility by starting with a few low-cost applications that wow the business side **BY HANK ZUPNICK**

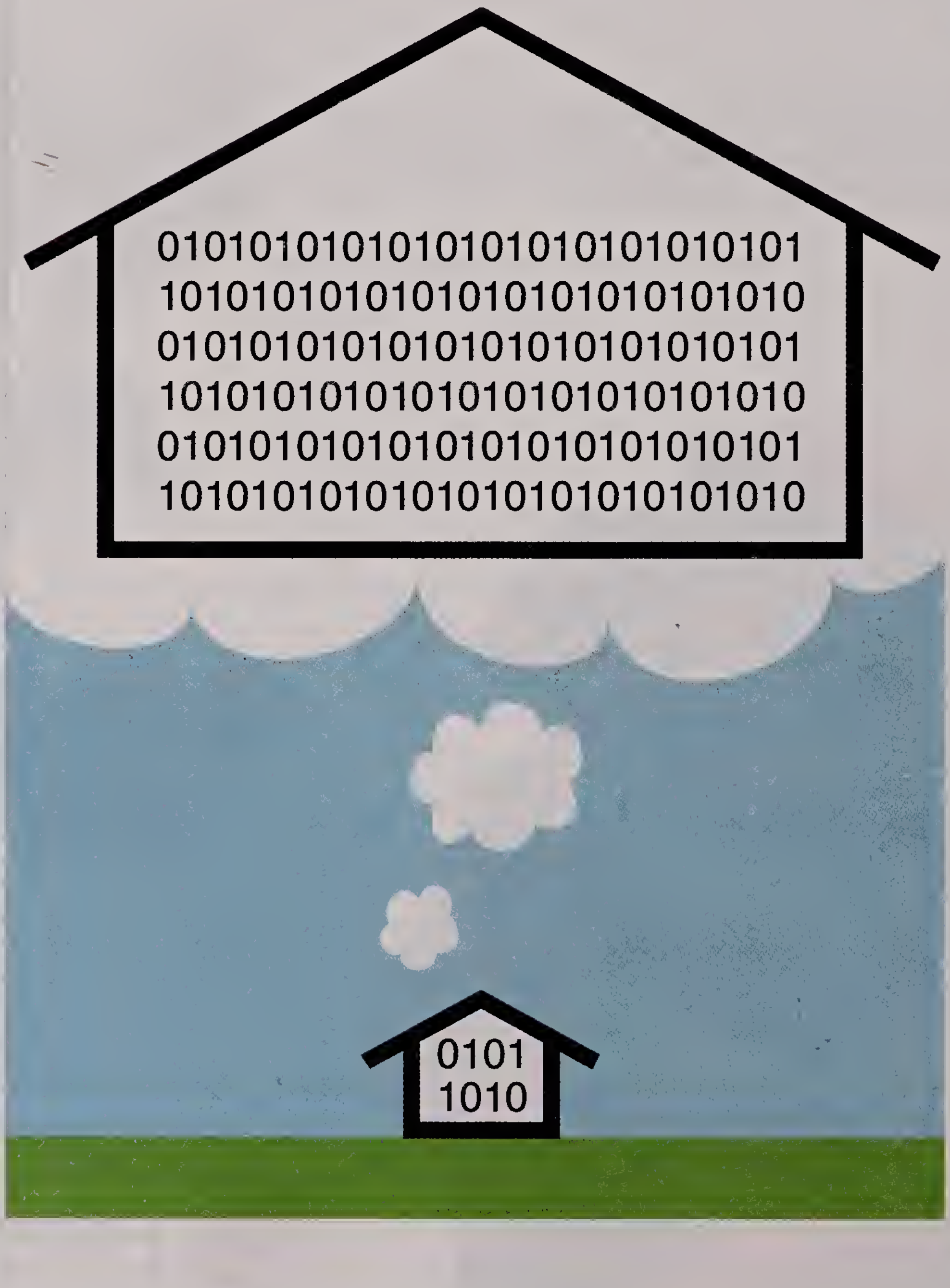


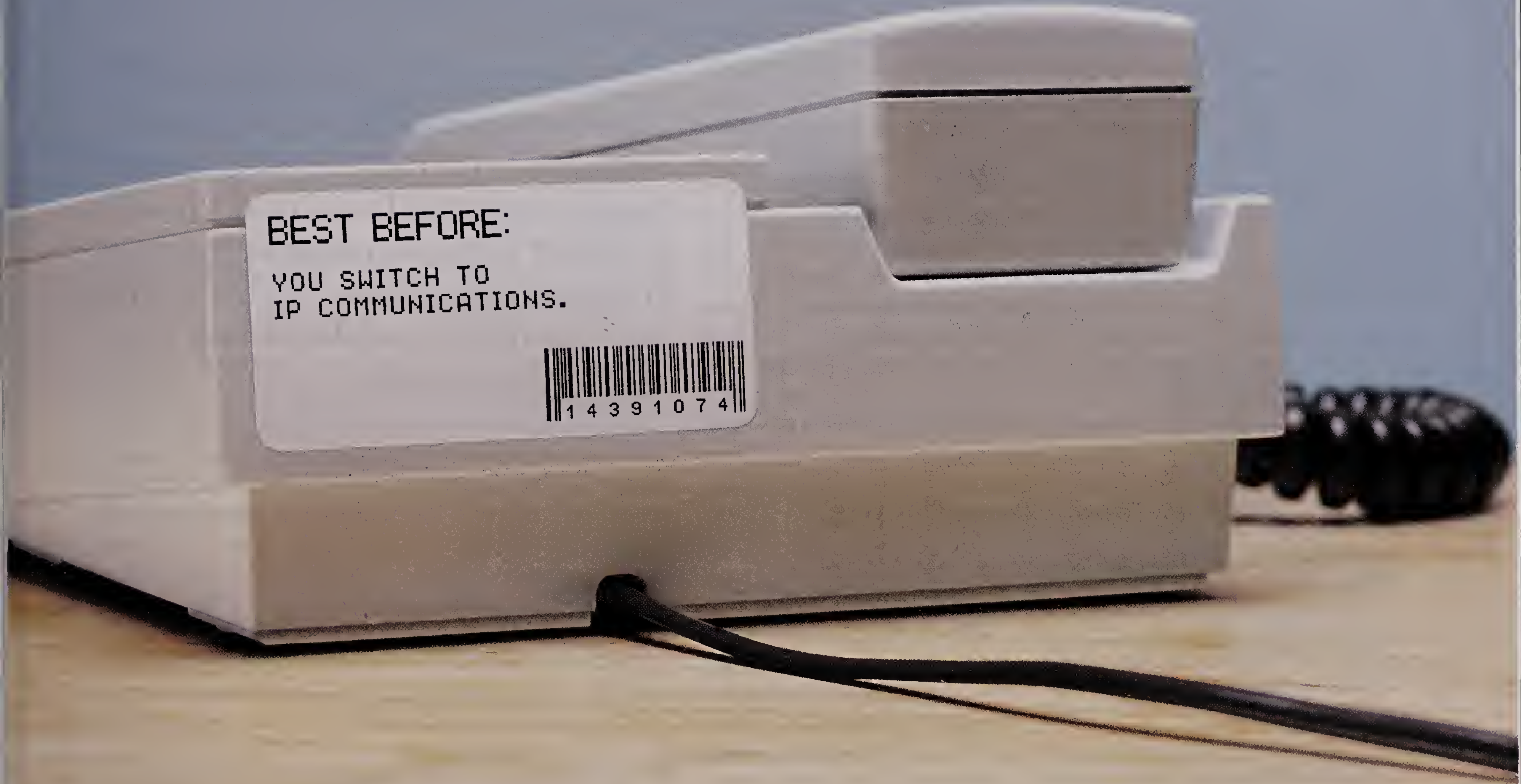
ILLUSTRATION BY MARK DANIELSON

The CFO of GE Real Estate was perplexed. "Let me make sure I heard you right. We're willing to fully fund this project, but you only want 10 percent of the money?"

In today's tightly managed, cost-conscious business environment, it's hard to resist saying yes to any funding that's offered. It's even harder to explain why you'd rather accept a much lower level of funding when there's no guarantee that the money will be available if you need it later on.

But that's exactly the approach I took when our CFO offered to fund a businesswide data warehouse that would help us grow and manage our global commercial real estate business. Before I explain my reasons, let me tell you why we needed a data warehouse in the first place.

The commercial real estate financing business has been getting more competitive over the past few years, as more banks and other financial services companies enter the market. GE Real Estate has a strong track record of profitability; net earnings have increased by 10 percent or more each year since 2000. Even so, we knew we needed to be able to provide our customers with faster delivery of quotes and approvals, while at the same time pricing between 20,000 and 30,000 deals a year. Much of the information GE Real Estate's managers relied on was stored in spreadsheets or in hard-copy reports. Figuring out how GE's loans were performing in each particular market and what kind of risks should be factored into a $30 million deal—a fairly routine bit of analysis—required employees to gather data manually from several sources. Errors are unavoidable in a manual process, and they could be costly: Misunderstanding GE's loan-portfolio performance in



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Denver or Dublin could mean charging a customer too low an interest rate and exposing GE to too much risk. Charging too high a rate could prompt the customer to take a lower rate from another lender.

Furthermore, with more than 8,000 buildings in our portfolio around the world, we needed a fast, efficient, accurate way to track the performance of the properties we were financing. This included better insights into the corporate health of our borrowers' individual business tenants. For instance, if a telemarketing company in Geneva was going out of business, vacating five floors of a building on which GE holds a $10 million note, the loan might be at risk. That's the kind of information the head of GE Real Estate's European division needs to know.

We decided that a data warehouse and Web-based reporting system would be the ideal solution. But we also knew it could be very expensive and time-consuming to develop, and the process is full of uncertainties. Every CIO is familiar with the research showing that the vast majority of such projects fail. Since data warehouses often span multiple departments, there's the inevitable challenge of deciding which department gets capabilities first. And then there's the task of reconciling different content definitions. In our case, each department used the same terms to mean different things. In marketing, for instance, vacancy might mean unleased space; for Property Management, it might also include leased space that's currently unoccupied by the lessee.

Share Your Opinion

Everyone talks about the business side, but not everyone knows how to win it over. Sometimes, like Hank Zupnick, you have to **prove yourself with small, easily won projects** before you launch the mother ship. Has this approach worked for you? Or have you just damned the torpedoes and steamed ahead? Share your learnings with colleagues on the online version of this article. Find the link at **www.cio.com/061505**.

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Agreeing on data definitions, ensuring the integrity of complex data arriving from heterogeneous sources, and managing multiple businesswide priorities can easily overwhelm even a "reasonable" project schedule. And with a data warehouse, there's no place to cut corners when it comes to data integrity. Put simply, dirty data can kill the credibility of your data warehouse.

And data warehouses—which demand that each department use the same terms for the same things, and are useless without absolutely accurate information—fail more than most.

More than a Pilot, Less than a Megaproject

Given these challenges, I decided that the best way to successfully deliver a large, robust data warehouse would be to start with a small, narrowly targeted data mart. And then if that worked out, we could build another. So rather than accept a pot of money to build everything we needed, we quickly developed and rolled out several single-purpose, low-cost data marts. We hoped that these would provide just enough functionality to demonstrate the business value of a larger system.

We understood that even if these small data marts were wildly successful, additional funding could not be guaranteed. But if it turned out that the business didn't really want or need a data warehouse after all, it was better to know that after spending only 10 percent of a multimillion dollar investment. In addition, when it came to getting the business units to agree on data definitions, it was easier to get their help with a small project than a megaproject. It demanded less of their time, and they'd be able to see benefits sooner.

When it came to getting the business units to agree on data definitions, it was easier to get their help with a small project than a megaproject. It demanded less of their time, and they'd be able to see benefits sooner.

So we developed an implementation plan, using stringent portfolio management guidelines to determine which capabilities to offer at launch and which could wait until later versions of the system. My team worked with the business side to develop cost-benefit analyses for every requested capability, looking at the hard benefits (of automating something instead of doing it manually) and the soft benefits (what is the cost of a bad decision on a loan?).

Scaling to the Enterprise

This is not to say everything went smoothly. One department, while nominally supporting the effort, consistently failed to make key experts available for our analysis meetings. Rather than let them hold us back, we decided to focus our initial data marts on other parts of the business that were more enthusiastic.

Our first small data marts went live within months of the project's initial launch and quickly began delivering easy to use, real-time, high-quality data to our business leaders and specialists. After that came further investment—beyond even what we had ever considered—as the early data warehouses uncovered new opportunities. For instance, our hospitality lending group was able to identify distinct types of hotel loans with differing performance histories, thus allowing the group to target new niches of opportunity.

Dan Smith, senior vice president of our North America Debt Group, was also an early supporter: "I could immediately see how the data warehouse was making my entire organization more productive and responsive and helping us to reach our aggressive growth goals."

However, what worked for two or three small data marts wouldn't scale to a large, complex data warehouse. To build for the future, we began migrating from a Microsoft server to a Unix environment complete with Oracle databases. We used Informatica for back-end data extraction, transformation and loading, and Cognos reporting tools.

The data warehouse is saving GE Real Estate more than $2.5 million a year in labor.

A Moment of Triumph

Thus far, we have invested approximately $5.9 million in our data warehouse, and the ROI is encouraging. The data warehouse is saving GE Real Estate more than $2.5 million a year in direct labor costs by providing quick and easy access to data that previously required extensive research. The intangible benefits are harder to quantify, though significant: They include the ability to respond faster and more decisively to business opportunities, improved risk and property management, and a better command of market issues.

But for the business sponsors who invest in IT projects such as this one, some benefits are truly priceless. Not long after the launch, Jayne Day, our senior vice president of global risk management, was on her way to a quarterly meeting with corporate headquarters executives when she heard a news bulletin that a blue-chip company—and major tenant—was falling on hard times. While still en route to the meeting, she keyed in to the data warehouse to assess our real estate exposure. Less than an hour after the first news report, when a senior executive at the meeting asked how it might affect us, Jayne had the numbers right at her fingertips. What's more, she could report on the instructions she had already given to the affected property managers in Dallas and Manchester, United Kingdom.

In our profession, it's hard to match those moments of triumph when business sponsors see firsthand the rewards of the technology projects that they've championed. But to get those big wins, sometimes you have to start small. CIO

Hank Zupnick is CIO of GE Real Estate, a global real estate company with 2004 net earnings of almost $1 billion. Reach him at *hank.zupnick@gecapital.com*.

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The "Off" Switch

Leaders need to think, and you can't do that if you're always on—on call, on duty and on guard

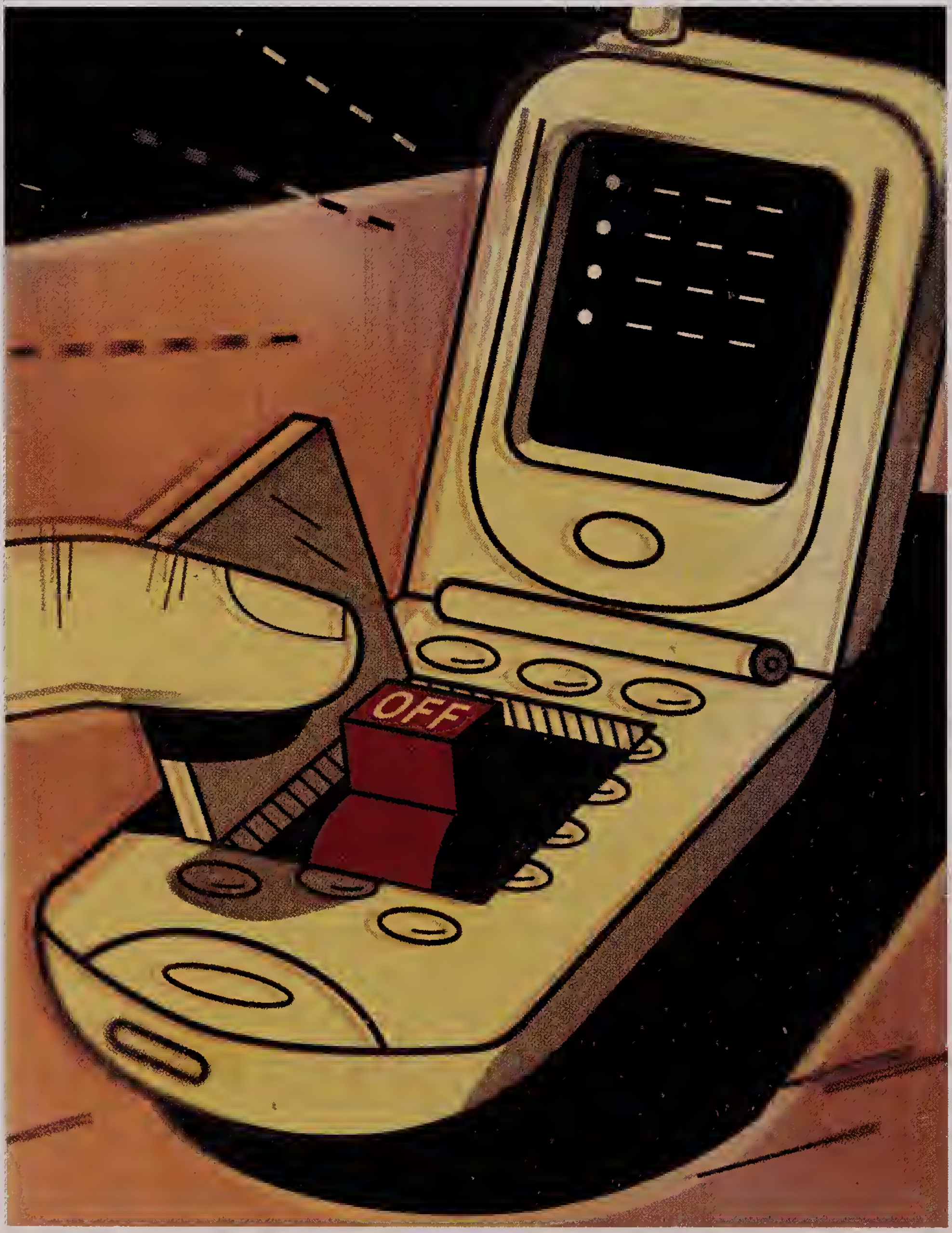

ILLUSTRATION BY HARRY CAMPBELL

I enjoy exercising on a treadmill, even though I know that no matter how fast I go or how long I run, I will end up in the same place. At least I have the consolation of being more fit and healthy after my exercise. If only the same were true of the leadership treadmill. We run from the break of dawn until the stroke of midnight, instantly available to one and all. We are exhausted physically and mentally. We have taken no time to think strategically about the future, or even to reflect on the short term.

As a result, we are depleted—that is, less focused, less energetic, less decisive—as leaders. We have to get off the treadmill, or else we'll be unable to see our priorities, facilitate results and enable the development of our people.

There are a variety of phenomena that have driven us to this state. Economic pressures, once cyclical, have been an ever-present part of business for at least the past decade. Meanwhile, technology has had an impact on the pace of our days. Cell phones and BlackBerrys have increased our mobility, but they also pressure us to respond to every little thing. I once heard a presentation about a phone system that can get a message to you by any device. I thought, Great, now we can have a corporate version of hide-and-seek! Whether we gain productivity or lose it depends on whether we use technology to enhance our lives or allow ourselves to be abused by it.

Stop Running

You know you're stuck on the treadmill when "irritated" defines your attitude. Your work suffers. You rush through budget preparation, and must do it over when it doesn't meet corporate guidelines. You have systems that never met business needs because requirements planning was given short shrift. Eventually, your people lose any sense of when a task is urgent, and they discount the importance of activities that never seem to be completed.

Time-pressured decisions (and the behavior that accompanies them) will erode your effectiveness and your sustainability as a leader. Yes, the world seems to demand a short-term focus, but at the same time, we are expected to deliver the results of long-term thinking.

Start Getting Somewhere

Your health, your peace of mind, maybe even your job are at stake—unless you get control of your life. When children are young, we discipline them with "time-outs" in the hope that they will reflect on their behavior and change their ways. We may need executive "time-outs" to gain the distance needed to rediscover or reevaluate what is important in our lives.

We rarely take time off for good behavior. But taking a long vacation, as much as it rejuvenates you, won't keep you off the treadmill once you get back to the office. You need to give yourself regular breathers during the workweek to remain an effective leader. For instance:

- **LEARN TO SAY NO.** You can even say no to your boss (diplomatically, of course). Explain impacts on time, cost and the established priorities that will have to be reordered if you address the latest demand. And let some things go; they may never be missed.

I remember a time when my job required me to lead my organization through a major change. The effort to keep everyone focused on getting results in this environment was intense. And I needed to be in the office to do it. But as a member of the executive team, I was expected to attend events that required travel or out-of-office time. After a fair amount of agonizing, I finally told my boss that I was going to limit the number of executive events I attended until the organizational change secured its own momentum. I missed out on some enjoyable events and on relationship-building opportunities, but visibly leading the organization through a difficult transition was the top priority.

You need to give yourself regular breathers during the workweek to remain an effective leader.

- **ESTABLISH QUIET TIMES.** You should have one day a week without meetings, and you should ban cell phone calls or instant messaging during certain hours.
- **DELEGATE.** Figure out which decisions really need your personal engagement. Let someone else handle things that do not absolutely require your participation.

Continued on Page 38

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Buttressing the Business

CIOs should stop trying to achieve buy-in for IT initiatives and start helping business colleagues sell the projects themselves

ILLUSTRATION BY DEVON BOWMAN

An ambitious CIO came up with an excellent idea for one of the business units. He did some due diligence on the Net, sent out e-mails, made a few calls and built up a pretty decent business case for his proposal. The executive running the business unit even liked the idea. Alas, he didn't find it compelling enough. The conversation—and the CIO's initiative—fizzled out.

"Michael," said the frustrated CIO, "I just couldn't persuade him to take the next step. How do I get buy-in?"

"Dude," I responded, "stop selling buy-in. Your IT shop has to get itself out of the buy-in business and start practicing 'sell with.'" IT should avoid being the organization's "sales leader" for technology-enabled productivity and change. Persuasion can't be—and shouldn't be—your core competence. Salesmanship is not your friend.

Too many CIOs invest too much time and energy trying to get colleagues and peers to buy in to IT initiatives. They're pitching and wooing and selling with every ounce of charisma they have—which, for IT executives, tends to be on the lighter side.

If you've got the charm, loquaciousness and skill to sell iceboxes to Eskimos, what the heck are you doing in IT? You should be raking in commissions on the vendor side. But if you truly happen to be a gifted salesperson for internal IT initiatives, chances are your problem is expectations management. You do such a fine job selling that the actual implementation ends up as either an unhappy anticlimax or a bitter disappointment. Not good.

The most effective IT executives I've observed have learned (usually the hard way) that the pursuit of buy-in is a chimera. What works is subtler but demonstrably more powerful: Turn the IT client into a sales partner. Get the client to sell with you instead of buying from you.

That means don't waste time trying to persuade someone to adopt your idea or implement your app. Instead, figure out ways to get people to help sell that idea or implementation to someone else. Former Apple exec and current venture capitalist Guy Kawasaki has called this "turning customers into evangelists." I call it "turning customers into VARs"—value-added resellers. IT clients and customers should be viewed—and treated—as resellers of IT's systems, services and reputation, not just as customers.

Consequently, IT should never be driving a CRM or sales account management system implementation within the enterprise. Never. Instead, IT should be getting the sales and marketing vice presidents to champion those initiatives with IT's open—but clearly subordinate—support.

The truest test? The CIO shouldn't be making the CRM case before the CFO and the CEO—that's marketing's job; that's sales' job. The CIO should be the person most responsible for making it easy for sales and marketing to make that case.

Don't Lead, Enable

What does enabling sales look like? A talented webmaster rigged up an internal Salesforce.com account management knockoff for his division's sales teams. Within six months, the salespeople wanted a bit more support and functionality from the bootlegged ASP. Their boss went to IT for money and manpower. The CIO heard about it.

The most effective IT execs have learned that the pursuit of buy-in is a chimera.

The creatively opportunistic CIO shrewdly decided to cut a deal. He brought the webmaster, the sales manager and a couple of the salespeople to the attention of the sales VP to demo their working system. The sales VP was impressed. So the CIO suggested that the sales VP go to the COO and CFO and push for a rollout of an enterprise sales ASP. The CIO would say how impressed IT was with sales' initiative and point to the bootleg ASP as a prototype for a successful system. The sales VP agreed. He did a successful job selling. He didn't buy in to IT; he sold with IT.

In an ideal world, the only thing the CIO should have to say at that presentation is, "I think they've made a terrific business case for scaling the system, and I'm confident we can implement exactly what they've proposed in a time frame and a budget that's doable. They've done a superb job defining what they need to make this work. We look forward to making it work with them and for them."

In an ideal world, the CIO would then sit down and shut up—albeit with a smile, a wink and a nod.

Continued on Page 38

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Michael Schrage

IT'S ALL ABOUT THE EXECUTION *Continued from Page 37*

In other words, IT shouldn't be a change or transformation leader; it should be a change or transformation enabler. What's the essential difference? For the purpose of this column, leaders are those individuals most responsible and accountable for setting the right objectives and ensuring the right results. Enablers, by contrast, are those individuals most responsible and accountable for providing leaders with the tools, techniques and technologies for achieving those objectives and results. Enablers make effective leadership practical and probable.

Bluntly put, CIOs shouldn't be leading CRM or supply chain precisely because, in the first and final analysis, they are not ultimately accountable for determining and assessing the metrics of success. What effective CIOs should do is push people in the organization to figure out what IT should best be enabling.

In an ideal world, the CIO's most valuable influence would be enabling leaders in other parts of the organization to achieve their enterprise potential in partnership with IT. More than a few operating executives have complained to me about CIOs who insist that this new upgrade or that new app is going to make their lives easier. They feel like they're being sold. Are they right? Or are they cynical?

Voice Your Opinion

How have you gotten out of the buy-in business and started "selling with" your business units? Share your tips with colleagues in the **ADD A COMMENT** section online. Find the link at **www.cio.com/061505**.

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What these operating executives suspect is that IT is pushing these initiatives to make its own business life easier. Bidding for buy-in inherently distorts the perception of IT as a partner. Even worse, having the CIO positioned as a "leader" often creates a sense of rivalry with the other C-level executives. Sometimes rivalry creates a healthy sense of competition. Frequently, however, operating executives feel that "visionary" CIOs view their colleagues as operational extensions for their digital ambitions.

The best way to confront this issue is to rebrand the CIO as a process enabler rather than a business leader. CIOs can do this by helping seed scalable initiatives throughout the enterprise that can be harvested as future partnership opportunities. Explicitly restructuring the IT budget and deployment process around the notion of CIO as junior partner rather than *primus inter pares* (first among equals) would also help.

The greatest virtue of annihilating buy-in as a business driver is that it requires executive leadership to take greater responsibility for shaping digital initiative implementations. The CIO succeeds not because he's good at persuading colleagues about the value of IT but because he's good at getting colleagues to persuade each other to explore IT's potential.

Michael Schrage is codirector of the MIT Media Lab's eMarkets Initiative. He can be reached at *schrage@media.mit.edu*. Please send comments to Executive Editor Alison Bass at *abass@cio.com*.

Patricia Wallington

TOTAL LEADERSHIP *Continued from Page 35*

One way I was able to enjoy vacations was by appointing someone to sit in for me while I was gone. They had the authority to make decisions—and my commitment to live with those decisions. Not only was this great for an uninterrupted vacation, it was also a wonderful developmental tool for my staff.

- **TELECOMMUTE.** Try to work at home one day a week. You will be amazed by how much you can get accomplished without constant interruption, whether you're cleaning up the stuff you never get to or preparing a difficult presentation. Obviously, you have to set rules about interruptions. (My assistant knew to call me if a customer wanted to reach me.) If there are no such rules, you may as well be in the office.
- **SET AN EXAMPLE.** Close the 24-hour emergency room that instant communication enables. Tell your direct reports to use your cell phone number only for true emergencies. You may have to redefine what constitutes an emergency. Once, I pressed my boss for a quick approval because I hadn't built into my plan sufficient time for him to evaluate my proposal. He told me, "Your lack of planning does not constitute an emergency for me." I never forgot this.

Then, give your people the time off that you are trying to wrest for yourself. Don't demand that they be always on or reward them on that basis. Your staff will emulate your behavior, because they will assume that what you do is what you value. Coach them in creating a similar environment among their own teams. Soon, everyone in your IT organization will be more productive, more responsive to business needs and enjoy a more balanced life.

Stay the Course

The next challenge will be to avoid going back to the behavior that caused the burnout. There will be the saboteurs—a customer, a boss or someone under you who likes to delegate decisions upward—who will want the Type A person back. When you're tempted to revert to your fire-fighting ways, listen to these lines from Clint Black's song "Haywire": "Downloaded, overloaded—my computer knows where I am. World's gone haywire, and the wire is getting long. Hanging on to nothing.com." This will inspire you to stay the course.

PHOTO TOP BY JOHN SOARES

Before retiring in 1999, Patricia Wallington was corporate vice president and CIO at Xerox. She is now president of CIO Associates in Sarasota, Fla. Send feedback to *leadership@cio.com*.

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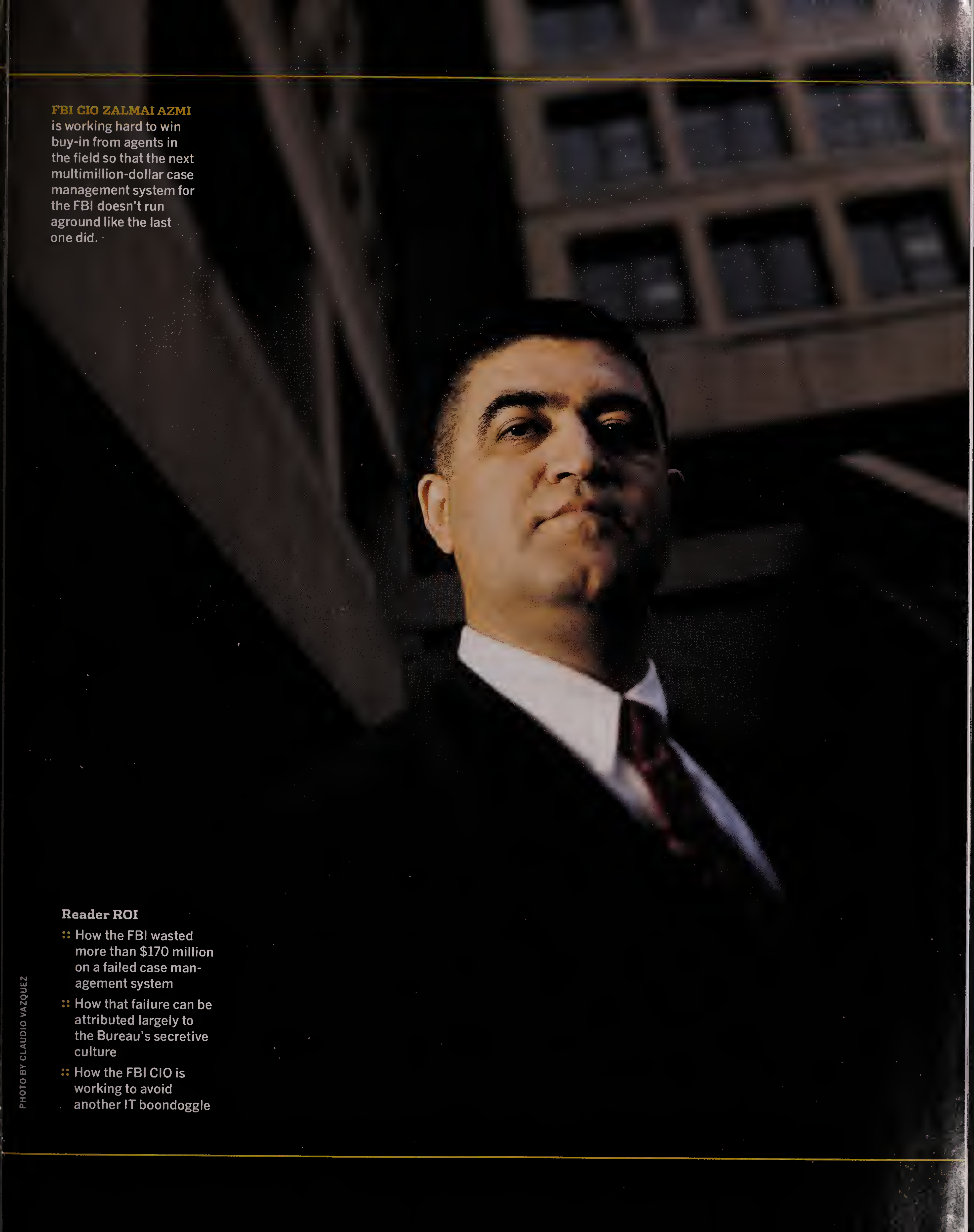
The FBI's new CIO must change the agency's cultural bias against information-sharing and technology before it can become a global intelligence operation truly capable of preventing crime and terrorism

Why the G-Men Aren't IT Men

BY ALLAN HOLMES



FBI CIO ZALMAI AZMI is working hard to win buy-in from agents in the field so that the next multimillion-dollar case management system for the FBI doesn't run aground like the last one did.

Reader ROI

- How the FBI wasted more than $170 million on a failed case management system
- How that failure can be attributed largely to the Bureau's secretive culture
- How the FBI CIO is working to avoid another IT boondoggle

PHOTO BY CLAUDIO VAZQUEZ

In the past few months, FBI CIO Zalmai Azmi has been very careful not to say, “I told you so.” After the FBI was forced to scrap its $170 million virtual case file (VCF), a case management system, because of numerous delays, cost overruns and incompatible software, Azmi was finally given full authority over the agency’s IT budget and encouraged to centralize much of the IT decision making at FBI headquarters in Washington, D.C. He and other top executives at the FBI recognize that they must radically change the agency’s culture if the Bureau is ever going to get the high-tech analysis and surveillance tools it needs to effectively fight terrorism. The FBI, they say, must move from a decentralized amalgam of 56 field offices that are deeply distrustful of technology, outsiders and each other to a seamlessly integrated global intelligence operation capable of sharing information and preventing crimes in real-time.

Former IT managers at the FBI say that sharing information has never been standard operating procedure for the nation’s top law enforcement agency. In fact, FBI agents intent on solving crime are accustomed to holding information close to their bulletproof vests. Many agents scorn the idea of sharing information within the Bureau—and with other federal, state and local law enforcement agencies. Even when agents are promoted to management positions at headquarters, they bring with them the same secretive modus operandi to the day-to-day management philosophy in Washington, D.C.

“They work under the idea that everything needs to be kept secret,” says Sherry Higgins, the former project manager for the FBI’s $600 million IT modernization project. “But everything doesn’t have to be kept secret. To do this right, you have to share information.” In addition, FBI officials have long marginalized the role that IT could play in connecting the dots between seemingly unrelated intelligence, evidence and field notes. (Consider this: Former FBI Director Louis Freeh didn’t even have a computer on his desk.) The result is a history of troubled IT projects, including a system to automate 35 million fingerprint files, which ran over budget by $170 million and was delivered years behind schedule. An updated system created to give local police and sheriffs the capability to check for stolen guns, stolen cars and other crime-related data also fell years behind schedule and ran over budget by more than $103 million in the 1990s.

But the VCF’s failure caught the public’s attention more than any other FBI IT boondoggle, primarily because leaders in the FBI and Congress labeled it as the government’s primary weapon to fight terrorism. Without it, the FBI’s ability to stop terrorist acts before they happen was seriously jeopardized. “This program has been a train wreck in slow motion, at a cost of $170 million to American taxpayers and an unknown cost to public safety,” said Sen. Patrick Leahy (D-Vt.), a ranking member on the appropriations subcommittee for Commerce, Justice, State and the Judiciary, at a February hearing.

Changing the culture at the FBI will be a gargantuan task, Azmi acknowledges. The job has been so frustrating that many top executives left after only short stints. Between 2002 and 2003 alone, four CIOs came and went. And the $170 million VCF system ground through 10 program managers before it was killed. To stop this merry-go-round of failure, top officials say, the FBI not only has to learn to share information, which means communicating more honestly and more frequently with executives and field agents; it needs to establish basic IT management disciplines. As the agency’s newly appointed CIO, Azmi is working to win buy-in from agents in the field so that the next case management system does not run aground. His team has almost completed an enterprise architecture that will lay out standards for a Bureauwide information system.

But like other large global organizations that have endured huge IT failures, the FBI must first understand and learn from the failure of the VCF project. The story of what happened with VCF and how an organization’s culture affects the success of IT development has lessons for both private- and public-sector CIOs who strive to make their organizations more competitive and responsive to their constituents.

Azmi likens his work at the FBI to “running a marathon when you are out of shape. Every mile is an uphill battle and an accomplishment at the same time. The race is painful and the 26th-mile marker far away.”

A New Mission for the FBI

VCF was the key component in Trilogy, the FBI’s effort to modernize its infrastructure. (Trilogy also called for providing agents with 30,000 powerful desktop PCs and a high-bandwidth network to connect FBI locations worldwide; both of those projects have been completed.) VCF was supposed to enable agents to more quickly and easily share information with each other worldwide. As

PHOTO BY CLAUDIO VAZQUEZ

FBI Director Robert Mueller recently explained to Congress, VCF would provide an electronic means for agents to globally send field notes, documents, pieces of intelligence and other evidence so that they could hopefully act faster on leads. A congressional investigation after 9/11 identified poor communication as one of the reasons that the FBI didn't act fast enough on information about Middle Eastern men taking flying lessons. So agency executives hoped VCF would help move the balkanized structure of the FBI, in which agents rarely shared information on cases, to a more unified organization that would trade off leads in a real-time fashion. VCF would be "the first real change in the FBI's workflow and processes since the 1950s," according to a Justice Department Inspector General report.

At its core, VCF was designed to replace a paper-laden process with a Web-based one so that agents could attach to digital reports evidence such as photos, audio files, and possibly news and video surveillance clips. Agents could perform keyword file searches and control access on a need-to-know basis. Currently, agents use WordPerfect to write reports, notes and official documents, print them out, and then fax or send them via overnight mail to supervisors in other locations for approval. Once approved, the documents are faxed or sent back overnight. Clerks then key the reports into the system, a decades-old, Ada-based mainframe called the Automated Case Support System. The process takes days; VCF was designed to cut that time down to hours.

The VCF contract was awarded to Science Applications International Corp. (SAIC) in June 2001. The contract called for a Web-based front end that would link to legacy systems. Even when the contract was awarded, the FBI had yet to identify all of the requirements, Mueller told a Senate appropriations subcommittee in February.

The FBI will "throw good money after bad to cover up a bad decision." —SHERRY HIGGINS, A FORMER PROJECT MANAGER FOR THE FBI

SHERRY HIGGINS, a former manager for FBI's Trilogy project, says she was stymied by the agency's secretive culture.

But three months later, terrorists flew jets into the World Trade Center and the Pentagon, and the FBI was given a new mission: Stop terrorist attacks before they happen. The FBI scrapped the original VCF contract and determined that the new case management system must involve a complete replacement of its legacy systems to give the agency a more robust technology solution that would analyze clues, evidence and leads. In February 2002, the FBI asked SAIC to develop a much more ambitious VCF system that could manage millions of case files in a variety of formats, absorb hundreds of thousands of new case files every year and provide agents with a three-second response time to specific queries. Under pressure to respond to the terrorist attacks, the FBI asked SAIC to deliver the system in 22 months in a "flash cutover" strategy, which called for ditching the decades-old system for VCF overnight.

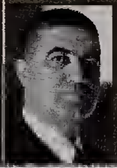
Yet even by then, the FBI had established few requirements for VCF. "Here is where SAIC made honest mistakes," said Arnold Punaro, executive vice president of SAIC, in testimony submitted Feb. 3 to a Senate appropriations subcommittee. "We should have known that this approach was too ambitious.... It was here that SAIC should have made its concerns known to the director," particularly concerning the flash cutover approach.

Mark Hughes, president of SAIC's system and networks solutions group, which oversaw VCF development, says his team did express concerns about the drastically changing scope of the project to program managers at the FBI. But he suspects those concerns never reached Mueller. "We took for granted the message was being moved up the management chain," Hughes said.

They shouldn't have.

The FBI's Revolving Door

The nation's top law enforcement agency has seen five CIOs come and go in almost as many years.

Name	Former Position	FBI Tenure
Bob Dies	General manager of IBM Network and Personal Computer Division (retired)	CIO, Nov. 2001–May 2002
Mark Tanner	Information Resources Manager	Acting CIO, May 2002–July 2002
Darwin John	CIO, Mormon Church	CIO, July 2002–May 2003
Wilson Lowery Jr.	Chairman, IBM Credit Corp.	Acting CIO, May 2003–Dec. 2003
Zalmai Azmi	 CIO, U.S. Attorneys' Office	Acting CIO, Dec. 2003–May 2004; CIO, May 2004–present

Source: FBI

An Atmosphere of Secrecy

In late spring 2002, just three months into her new job as Trilogy program manager, Sherry Higgins wanted to know the answer to a simple question: Why did the Bureau's top executives and the project's contractor, SAIC, insist on using IBM mainframes as the platform for the VCF project, rather than cheaper and more efficient thin clients or Web-based technology?

Higgins couldn't get a straight answer, so she called a meeting with executives from SAIC. She recalls that the answers she got to her questions were vague and evasive. At another meeting a few months later, Higgins asked point-blank why SAIC was dead set on mainframe technology. Finally, "they said that that was what the FBI directed them to do," Higgins recalls.

Higgins then tried to find out why the Bureau wanted to pursue mainframe technology. She called another meeting with about 15 FBI IT experts and asked each attendee why the FBI had directed SAIC to use a mainframe platform. No one offered a reason, until Higgins called on Fred Dexter, then deputy assistant director for information resources management. As Higgins recalls, Dexter said, "It's that way because the leadership just spent $10 million on a mainframe, and they don't want it to go to waste." (Dexter, who has since left the FBI, could not be reached for comment.)

To Higgins, his answer illustrates one reason why the FBI had so much trouble equipping its agents with high-tech systems and software to fight crime and terrorism. "They'll throw good money after bad to cover up a bad decision," says Higgins, who is now a senior consultant for the International Institute for Learning.

Higgins, a seasoned program manager who has handled major projects for AT&T, Lucent and the Olympics, quickly learned that the culture of the FBI was dominated by a secretive G-Man mentality. Secrecy may be useful in investigating crimes, but it created an atmosphere of distrust among field agents and managers in headquarters, Higgins says. The secrecy also bred a culture of intimidation, say former FBI and U.S. Justice Department managers. Many current FBI and DoJ IT employees, former FBI executives and Washington IT experts familiar with the FBI either declined to be interviewed for this article or requested anonymity. "There always has been a culture of intimidation at the FBI," says one former IT manager. "It doesn't surprise me one bit that people don't want to talk."

Underlying the machismo was an even deeper problem: VCF, if it ever worked as envisioned, would shake up the agency's work processes and collide with the widely held perception among FBI agents that technology wasn't a central part of helping them do their jobs. Agents view gathering human intelligence as one of the primary means of working cases, with computers providing a supporting role, says Frederick Bragg, a special agent in Syracuse, N.Y., and president of the FBI Agents Association. "You can sit at your computer all day and look at what other people already know," he says. "Most agents would rather go out in the field."

Bragg acknowledged some resistance to technology; however, he said agents are not opposed to anything that can help them in their job. Agents do not fear technology, he adds. But having seen the VCF failure, and experiencing unfulfilled promises of other technology advances to help solve crimes, agents have become wary. "They are now more circumspect. They have an attitude: We'll believe it when we see it," Bragg says.

Ken Orr, head of the Ken Orr Institute and a former member of the National Research Council (NRC) committee, which advised the FBI on the VCF project, agrees. "The problem at the FBI appears to be mostly cultural," Orr says. "And that's orders of magnitude harder to correct than a project management problem."

The FBI's dismissive attitude toward IT was embodied by former FBI Director Freeh, who ran the Bureau from 1993 to just before 9/11. "[Freeh] was not an IT person," says a former DoJ IT manager familiar with the FBI IT culture. He and the businesspeople around him were uncomfortable within technology. "They only see IT as a back-office support function," adds the manager, who asked not to be identified. (Freeh did not return phone calls to his office at MBNA America, where he is in charge of government affairs for the bank.)

Robert Mueller came in as the new FBI director in September 2001, promising a fresh start. He identified upgrading FBI technology as one of his top 10 priorities. Yet two years later, not much appeared to have changed, according to several people familiar with the agency. In the summer of 2003, while Mueller and then acting CIO Wilson Lowery were interviewing Jerry Gregoire for the CIO post, Gregoire, who had been CIO for Dell Computer and Pepsi Cola, says they asked him what he would do to get VCF back on track. In response, Gregoire asked whether the FBI had considered killing VCF and starting over. The answer he recalls is, "We can't because that's not how things are done here, because you have to take the heat and go to Congress."

Top FBI officials resisted scrapping the case management project because they feared attracting congressional ire.

He adds, "I came out of that meeting saying, Holy smokes, I don't know if I can help them." Gregoire was offered and accepted the CIO job in September 2003. But within days, Lowery called him at his ranch in Austin, Texas, asking him to send a letter declining the offer, according to Gregoire. (Despite persistent requests for an explanation of why the FBI was withdrawing the offer, Gregoire did not receive any reason for the reversal.)

Gregoire was interviewed a few months after the quick departure of Darwin John, the former CIO for the Mormon Church and Scott Paper. John lasted only 10 months as FBI CIO before leaving due to what he would only describe as a disagreement on "a matter of principle" with Mueller. Looking back on his tenure as CIO, John describes the job of transforming the FBI IT operations as "the Mount Everest of IT challenges."

A Train Wreck in Slow Motion

That was the culture Azmi inherited in December 2003, when he left his CIO post at the U.S. Attorneys' Office to accept the acting CIO position at the FBI. (He was officially named CIO in May 2004.) When Azmi came aboard, one of the first questions he asked FBI management was how big his IT budget was. The answer Azmi received, delivered with a straight face, was $5,800. The reason: Nearly the entire FBI IT budget was controlled by field offices and other divisions in the Bureau, not the headquarters CIO. "Nothing really shocked me more," Azmi says.

Azmi also learned that the FBI had not fully complied with a law—signed by President Clinton seven years earlier—that mandated the responsibilities and competencies for federal CIOs. For instance, the FBI hadn't even developed basic IT policies, an enterprise architecture, a portfolio management strategy or a strategic plan. "I was surprised to see that an organization as large as the FBI, and with such a critical mission, [did not have in place] some of these basic things," Azmi says, shaking his head.

After he killed the project this year, **FBI DIRECTOR ROBERT MUELLER** finally gave his CIO authority over the Bureau's IT budget.

As for VCF, Azmi says he noticed immediately that there were too few FBI technicians compared with the number of SAIC contractors. As a result, the FBI could not keep up with communicating the ever-expanding requirements for VCF to SAIC developers. SAIC was filling in the blanks and making too many key development decisions, he says.

To meet the December 2003 deadline, SAIC created eight software teams, which included 250 full-time positions, to write software and develop applications to meet ever-evolving requirements. Turnover at the FBI caused the requirements to change frequently, both Hughes and Punaro say. Since November 2001, the FBI had 19 IT management changes. "Each change brought new directions, a different perspective on priorities and new interpretations to requirements," Punaro wrote in his testimony to Congress. In all, the FBI asked for 36 contract modifications, an average of one and a half change orders per day. The numerous requirement changes were "the most damaging aspect," Punaro testified. As a result, the price for the entire Trilogy project ballooned from an original estimate of $379.8 million in 2000 to $596 million by 2004, according to the U.S. Government Accountability Office.

In December 2003, SAIC delivered what it later described as a "snapshot in time" of the software for VCF. An independent evaluator, Aerospace Corp., tested the system as if the copy were a finished product and found numerous deficiencies. The NRC also delivered a report in May 2004 to the FBI, concluding that "the FBI's IT modernization program is not currently on a path to success." The report recommended the Bureau abandon its big-bang implementation in favor of an incremental approach and develop better program management skills and personnel.

These reports convinced the FBI that its flash cutover strategy was too ambitious. In June 2004, the agency changed its approach, requiring only that an initial operating system focusing on workflow processes be delivered by December 2004. The full operating VCF system would be delivered in 2005. SAIC delivered an initial VCF workflow process system on time, and in January, the initial VCF system was delivered to the FBI's New Orleans office for agents to test. Azmi traveled to New Orleans in March to meet with the agents and collect their reviews. He came back with bad news for Mueller. Two months after the system was deployed in New Orleans, with the FBI having spent 1,800 hours training 240 agents to use the system, Azmi reported to Mueller that the program was too complicated for agents to use.

A week later, Mueller finally informed Congress that he was going to do what IT experts say should have been done years earlier: Kill VCF.

Airing Out the FBI

Now a year into his job as the FBI's fifth CIO, Azmi has made some progress in building a firmer foundation for IT. In February, Mueller finally gave Azmi budget authority over the Bureau's IT budget—a rare occurrence for the federal government, in which most budget power resides with federal CFOs or with IT managers in divisions deeper down the agency's organizational chart. The budget authority will give Azmi the power to more easily consolidate IT applications and systems, and dictate standards across the agency. Azmi says he also recently solved some issues with the Bureau's enterprise architecture, and now he can consolidate systems and develop new ones based on the agency's mission to combat crime and terrorism. Azmi is close to identifying all of the FBI's IT projects to fulfill his goal of establishing a portfolio management plan. He is in the process of creating a five-year strategic plan to guide IT development and spending.

Azmi is also trying to change the agency's traditional skepticism of IT. He meets regularly with key stakeholders, such as the special agents advisory group, to solicit advice on functions for the new system to replace VCF. He also has appointed a visiting special agent (who rotates in every six months) to his staff to inform Azmi and the IT department about which technologies field agents need. In turn, the visiting agent learns how the CIO office and IT operate, information that he can take back to fellow agents. And every six months, Azmi calls an "all-hands meeting" with the entire 500-member IT staff to discuss how things are going.

In March 2005, Azmi delivered on the first promise he made when he was named CIO. The help desk typically closed at 7 p.m. EST, after which technicians were reachable only by pager. Last year, Azmi promised agents worldwide that they would have access to a round-the-clock help desk. In March, Azmi told agents that the help desk was open 24/7. I want them to know that "if they're on the job, we're on the job," Azmi says.

In late May, the FBI announced it would build a new case management system called the Sentinel in four phases. The agency is expected to issue an RFP for the project this summer. Azmi says he plans to deploy several capabilities, including workflow, document management, record management, access control, audit trails, single sign-on and PKI applications. Azmi realizes that the transition to the new system will require winning over agents first. To manage expectations, he plans to communicate often and pour lots of resources into training agents.

"We want to automate those things that are the most manually cumbersome for the agents so that they can see that technology can actually enhance their productivity," he says. "That is how to change their attitudes."

So far, Azmi has received high marks for what he has been able to accomplish. "He's made an improvement over time," says Randy Hite, the GAO's director for IT architecture and systems issues. "There are a lot of things contributing to the challenges for the organization, and some are being dealt with now."

But Congress and other government and private watchdog groups continue to cast a critical eye on the FBI's efforts to join the 21st century. In a recent report, the National Academy of Public Administration, an independent government advisory group in Washington, D.C., raised the specter that Congress may have to pass a law requiring the FBI to develop a comprehensive information-sharing process if the Bureau does not immediately improve.

Hite says the Bureau still has a long way to climb toward elevating IT to the level in which it supports the FBI in meeting its mission of fighting crime and analyzing intelligence to fight terrorism. "It's a quantum leap from defining IT policies to making sure they are followed by the people out there managing projects," he says. "A kind way to describe the FBI is to call it a challenged organization."

Azmi is aware of the mountain that faces him—not to mention the consequences if he fails to deliver the support systems the agents need to fight against high-tech crime and terrorism. "Looking at the mission of the FBI and how critical it is, I will tell you that we are at war," he says. "And the best tool we have is information, and if information doesn't get to agents on the street in time, then we haven't done our job properly." CIO

CIO Washington Bureau Chief Allan Holmes can be reached at *aholmes@cio.com*.

Having seen the failure of the VCF project, FBI agents "have the attitude: We'll believe the new technology when we see it." —FREDERICK BRAGG, SPECIAL AGENT

Share Your Knowledge

Zalmai Azmi, CIO of the FBI, has his work cut out for him. How have you overcome secrecy and distrust? **ADD A COMMENT** at the online version of this story: *www.cio.com/061505*.

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High-dollar consultants
Lower user adoption
Escalating help desk calls
Long implementation times
Excessive maintenance bills

It's time to evaluate the economic impact of your critical business solutions

EXECUTIVE SUMMARY

For those evaluating alternatives to their existing mission-critical business solutions, this special report offers solid evidence that companies can enjoy dramatically lower total cost of ownership (TCO) with the new breed of midsize enterprise business applications without sacrificing vital functionality. "Many companies are making the switch and saving millions," says Dan Duffy, CEO of ePartners, a leading Microsoft Business Solutions (MBS) consultancy based in Dallas. "Through studies by Nucleus Research, we've found that our customers are achieving as much as a 375 percent ROI with payback in as little as three months."

CIO
Custom Publishing

Most midsize and larger companies have traditionally felt compelled to invest in enterprise-level systems from vendors such as J.D. Edwards, Oracle, PeopleSoft, and SAP to address their ERP challenge. While massive companies like Ford Motor Company, IBM and American Express require these tier one products, they are simply overkill for most smaller companies.

Times have changed, and today companies have choices. After weighing functionality and user adoption against projected total cost of ownership (TCO), many companies have made the switch to Microsoft Business Solution's (MBS), a broad range of solutions based on the Microsoft platform. These implementations and the consultants that deploy them help ensure lower costs and faster payback, all with the simplicity and core functionality that promotes greater user adoption.

inside ▸▸▸

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MBS VS. TIER ONE SOLUTIONS

Functionality

First things first. "When it comes to a technology solution, price is a factor, but functionality [and user adoption] is ultimately the deciding factor," notes Kathy Quirk, research manager for Wellesley, Mass.-based Nucleus Research, an independent research and advisory firm specializing in determining return on investment (ROI).

As with any technology implementation, companies need to establish business fit before talking dollars and cents. Does the solution align with their strategic vision? Does it do what they need it to do now and in the future? Does it drive business value? Will users embrace it? Does it increase the company's competitive advantage? If the answer to any of these questions is no, then the solution isn't a good fit.

For many years, tier one solutions have been the benchmark for comparing breadth of functionality, with MBS as the up-and-coming contender. J. Carlton Collins, president and CEO of Atlanta-based ASA Research & Accounting Software Advisor, LLC, and the editor of 15 accounting software and technology Web sites, points out that the majority of features touted by tier one solutions are now available in what used to be classified as lower-end systems. The non-tier one solutions all cover the basics, like accounting, human resources, supply chain, e-commerce and customer relationship management (CRM). Many even have robust databases, multi-

AN EXECUTIVE CHECKLIST

Evaluating Critical Business Solutions

Before embarking on the switch from a tier one solution, consider the following sage advice from those who have done it:

FIND THE RIGHT PARTNER

- Look for a solutions provider that puts business strategy first and enabling technology second. Steer away from product pushers.
- Make sure the provider's methodology is proven. Ask to see the measurement and reporting mechanisms behind it.
- Confirm that the solutions provider has extensive business and technical acumen. Validate its commitment to staff training and maintaining PMI (Project Management Institute) certifications.
- Find a partner that has a superior relationship with the software publisher. Is it part of the product

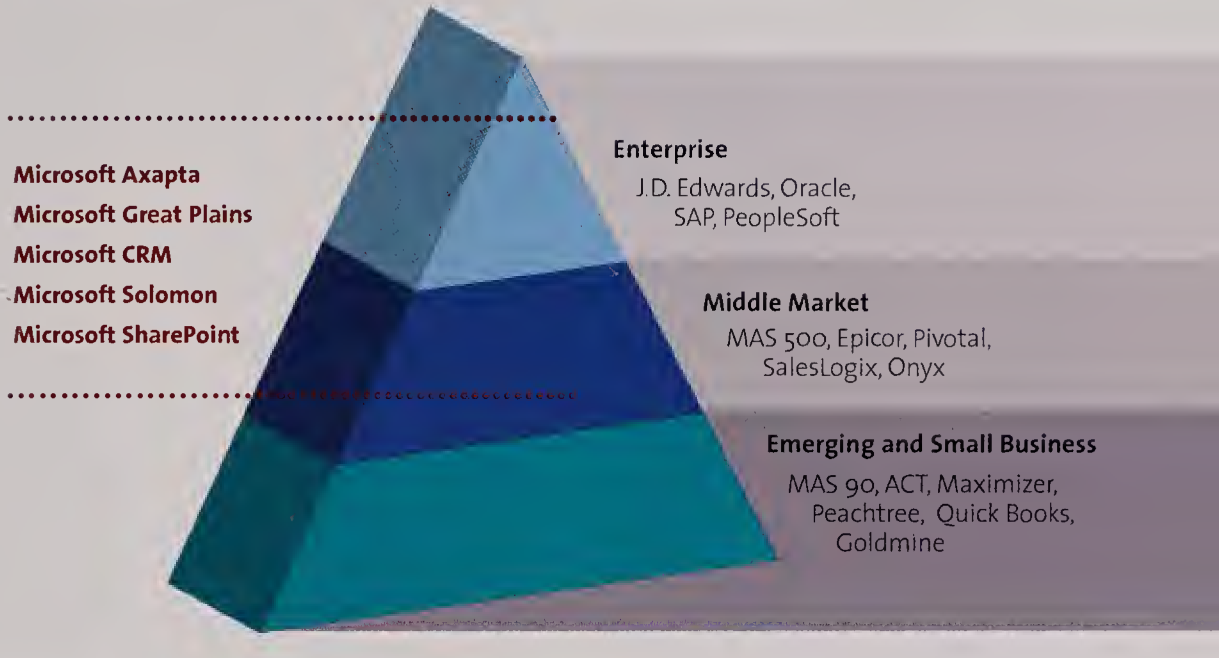
currency, foreign language support and other advanced features.

"Not only do today's systems provide most of the features offered by traditional ERP (tier one) solutions, but they are typically faster, easier, more customizable and less expensive as well," notes Collins in a recent article titled *ERP Gloom and Doom*. "By comparison, the **traditional ERP solutions have become bloated products that are slow, difficult, and too expensive."**

"Not only are licensing fees more affordable, but the inherent simplicity of an MBS solution helps contain implementation, customization and maintenance costs," ePartners' Duffy concurs. "In the end, all the core functionality is there at a fraction of the cost."

Business Solutions and Market Segmentation

MBS Solutions have been implemented successfully and are driving midmarket and enterprise businesses worldwide.


Microsoft Axapta
Microsoft Great Plains
Microsoft CRM
Microsoft Solomon
Microsoft SharePoint
Enterprise
J.D. Edwards, Oracle, SAP, PeopleSoft
Middle Market
MAS 500, Epicor, Pivotal, SalesLogix, Onyx
Emerging and Small Business
MAS 90, ACT, Maximizer, Peachtree, Quick Books, Goldmine

development process? Do its executives sit on advisory boards?

- Make certain your partner provides the required level of support. Ask for customer satisfaction stats and a history of resolving support issues quickly.
- Be sure that your provider has the infrastructure expertise to support your applications, the training experience to promote maximum user adoption and the development skills to perform the full integration.

FIND THE RIGHT SOLUTION

- Look for the solution that offers clear competitive advantage, seamlessly supports business strategy and will grow with the business.
- When it comes to functionality, do the proper due diligence. Make sure the ERP solution delivers business value and will be accepted by users.
- Only invest in solutions with a future. Make sure R&D reflects the vendor's commitment to the market and don't get left out in the cold by M&A activity.
- Don't settle for any solution without a proven track record of success. Ask to talk to several customers and drill them on the tough issues.

PAY ATTENTION TO FINANCIAL METRICS

- Remember to peel back all the cost layers to get an accurate read on TCO. The total cost of any technology solution goes far beyond licensing fees.
- To garner a successful ROI, use a financial analysis tool that is trustworthy and provides you with an accurate assessment of financial metrics.
- When talking to customer references, be sure to explore the financial aspects of their experience. Illustrating proven ROI from companies that have been down this road already is a great way to build confidence when making a final decision.

ESTABLISH TRUST

- Building trust with both the software provider and the professional consulting services organization is absolutely essential. Find partners that can be trusted and long-term advisors, not unlike your legal counsel and auditing firms.

> “We guide executives through a decision-making process that **ensures** ROI and TCO results meet the company’s overall business and financial performance goals.”
>
> —Dan Duffy, *CEO, ePartners*

MBS VS. TIER ONE SOLUTIONS

Total Cost of Ownership

TCO is an extremely important financial metric that helps ensure business and financial decisions are aligned with strategic technology investments. There are many aspects to measuring the TCO of a business-enabling solution:

LICENSING FEES When companies think of solution costs, they typically consider the obvious: per-user license fees. Licensing software based on the number of users can certainly add up, especially in upper-midmarket and large enterprise environments. What companies need to consider, though, are the capabilities they’re getting for the price and whether they can get comparable functionality for less. “When compared to a similar tier one solution, MBS has the functionality our clients want,” says Duffy. Here’s the kicker. The MBS software can be as low as $3,000 per user, while the same functionality with a tier one brand can be many times higher.

IMPLEMENTATION COSTS A business solution implementation is all about resources and time–and both come with a price tag. Any new solution must be integrated with existing systems and run properly on the infrastructure. Most companies need trained technical resources to rollout a solution. The more complex the solution, the more resources it takes, possibly overloading the existing staff and requiring new hires and consultants. All of this must be factored into the total cost of the project. In a recent white paper, a Microsoft partner calculated the necessary man-hours for typical enterprise deployments and found that a MBS implementation was completed in 40 percent less time than a similar implementation of PeopleSoft (PeopleSoft coming in at roughly 2,760 man-hours, as compared to the 1,240 man-hours required for an MBS implementation). Coupled with an hourly charge that is up to 40 percent lower than tier one rates (tier one consultants can run up to $225 per hour, while MBS consultants would be closer to $160 per hour), companies can realize significant cost savings with a Microsoft implementation.

CUSTOMIZATION CHARGES Customization is where the costs can really add up, and it’s often one of the line items that companies underestimate or forget altogether. The amount of customization directly correlates to how well the solution fits existing business processes and how well the consultants know their stuff. Some aspects of customization include system integration, data migration, reporting and verticalization. The good news is that not all

TCO CASE STUDY

Forgent Networks

In the 1990s, Forgent Networks, an Austin, Texas-based provider of intellectual property licenses and scheduling software, deployed a tier one product from Oracle. It was highly customized and expensive to maintain. At a turning point in its business, Forgent had to decide whether to sink more money into the ERP battleship or switch to a more manageable vessel. The next Oracle upgrade would be costly.

"We thought it would be a fairly simple project," says Michael Rondini, who is responsible for financial operations at Forgent. "But it turned out that a simple change–much less the full upgrade–would cost $50,000 to $60,000." Forgent would have had to hire an external Oracle consultant who would need to to learn the custom system and then do the work. In the end, Rondini decided to retire the Oracle system. **"We found that the cost of the Oracle upgrade would be more than installing a new [MBS] system," he explains. "In fact, MBS gave us the functionality that we needed at half the cost."**

solutions are as complex as tier one systems. Rooted in standards-based Microsoft .Net, MBS solutions can be easier to customize and integrate. For Forgent, this reality hit home. Its Oracle solution was custom-fit, and because no one on staff knew the ins and outs of the system, the company had to hire from the outside to do maintenance and even the outside Oracle consultant faced a stiff learning curve.

MAINTENANCE EXPENSES Annual maintenance fees are usually a percentage of user licensing. So when the licensing fees are high, as with high-end solutions, the maintenance costs are going to hurt, too. "According to Giga Research, PeopleSoft maintenance costs average 20 to 25 percent," says ePartners' Duffy. "MBS maintenance averages only 16 percent of the initial investment, which has a dramatic impact on TCO." In the end, tier one system upgrades can cost more than the entire MBS price tag. That's what Forgent found, as maintenance and upgrade costs helped make the decision to switch to MBS a no-brainer.

Time and time again, the TCO for MBS comes in at roughly 50 percent less than for tier one solutions. One Microsoft partner recently completed a study that put the TCO of MBS at less than $2 million, while its tier one competitor approached $5 million (see chart below).

TCO COMPARISON

The Reality Is in the Numbers

This chart compares the total cost of ownership for one MBS system against a tier one counterpart. The case is clear:

COST ITEM	PEOPLESOFT	MBS
Hardware Costs	$120,000	$120,000
Software License Fees	$500,000	$270,000
Implementation	$1,500,000	$405,000
Upgrades	$144,000	$40,000
5 Years of Annual Internal Support	$2,650,000	$834,750
TOTAL	$4,914,000	$1,669,750
5 Year Average Annual TCO	**$982,800**	**$333,950**

Source: Microsoft Partner Report; PeopleSoft Migration to Microsoft Business Solutions, Putting It all Together chart, pg. 10; July 27, 2004; http://www.microsoft.com/BusinessSolutions/mbs_compare_peoplesoft.aspx

About Microsoft Business Solutions

Microsoft® offers a broad range of full-functionality business solutions that meet the needs of upper midmarket and enterprise companies:

- **Axapta®:** Microsoft Business Solutions–Axapta is a multiple language, multiple currency ERP solution with core strengths in manufacturing and e-business; and strong functionality for the wholesale and services industries.
- **Solomon:** Microsoft Business Solutions–Solomon is a robust, flexible solution built to meet the needs of project-centric and distribution-driven companies.
- **Great Plains®:** Microsoft Business Solutions–Great Plains offers integrated capabilities for financial management, distribution, manufacturing, project accounting, human resource management, field service management and business analytics.
- **Microsoft CRM:** Microsoft Business Solutions–CRM automates sales processes to help increase sales success, deliver superior customer service and make informed business decisions.
- **SharePoint®:** Microsoft SharePoint products and technologies give users the ability to organize and access information, manage documents and enable efficient collaboration, all in a familiar, browser-based, Microsoft Office-integrated environment.
- **Microsoft Commerce Server:** Microsoft Commerce Server 2002 is an extensible solution that enables organizations to rapidly deploy personalized portals.

MBS VS. TIER ONE SOLUTIONS

Return on Investment

Who's Making the Switch to MBS

What kind of company switches to MBS? There are the standard attributes: young, agile companies with youthful cultures and small IT departments. Companies that are cost-conscious or overwhelmed with maintenance expenses and that aren't getting the expected returns. Companies that have opened their eyes to new technology. And companies that are ready to replace their costly and cumbersome tier one environments.

ROI for MBS solutions can be surprisingly high and realized within a matter of months. Nucleus Research cites a recent study in which the annual ROI for Microsoft was a whopping 375 percent.

According to Nucleus Research ROI Scores, MBS solutions rank high in business impact, with such benefits as "productivity enhancements that resulted in reduced or redeployed staff, reduced IT costs from replacing outdated or expensive systems, improved partner and customer satisfaction delivered through streamlined operations, and improved visibility into operations that enabled organizations to more easily identify and solve business problems and issues."

The critical elements that contribute to the ROI of business solutions include:

ENHANCED USER ADOPTION Companies need to think about deploying familiar technology that users will embrace. This bodes well for MBS implementations, as users are comfortable with the Microsoft platform. Microsoft represents "the language of the people," unlike the "foreign" languages of some tier one solutions. MBS solutions are easy to learn, offer the functionality users need and are useful to a wider group of people, including employees, partners, and customers. The result is increased user adoption and ultimately greater productivity. Forgent Networks' Michael Rondini concurs, "MBS systems are easy to learn, so our user adoption came very quickly."

RESOURCE MANAGEMENT Both Forgent and Dallas-based Southern Star Concrete Inc., the largest ready-mix concrete company in the U.S., were able to leverage existing Microsoft-savvy resources in lieu of hiring specialty consultants that can be expensive and singly focused. Implementations have been so resource efficient that Nucleus Research notes a recent study in which 56 percent of customers were able to reduce their staffing costs as a result of their MBS deployments. In its ROI Score studies, Nucleus Research reports that when companies moved from higher-

> "Our users couldn't wait to get off the J.D Edwards system. Not having to wait a year for the IT department to develop a report was a huge benefit."
>
> —David Marr, *CIO, Southern Star Concrete Inc.*

ROI ANALYSIS

Real Numbers Tell a Compelling Story

Nucleus Research analyzed a real world environment to illustrate the ROI associated with an MBS implementation. Here's the real return:

Microsoft Business Solutions	
Annual return on investment (ROI)	375%
Payback period (years)	0.27
Net present value (NPV)	$489,555
Average yearly cost of ownership	$56,600

Source: Nucleus Research, ROI Case Study: Microsoft Business Solutions-Solomon Orion Consulting, Calculating the ROI summary chart, pg. 4; October, 2004 priced ERP systems to MBS, "they saved money on IT support personnel."

BUSINESS PROCESS EFFICIENCIES By connecting the supply chain to the ERP systems and all the way to the desktop, companies can realize significant cost savings and operational efficiencies, not to mention make smarter, faster decisions. According to Nucleus Research, Omicron Consulting, a software development and network solutions provider in Philadelphia–realized a significant increase in project manager productivity thanks to its new MBS solution. The research shows that project managers used to spend three hours a week collecting and reconciling data. Now they're recycling that time into billable activities. "Our users couldn't wait to get off the J.D. Edwards system," says Southern Star Concrete's Marr. "Not having to wait a year for the IT department to develop a report was a huge benefit."

IMPROVED FINANCIAL MANAGEMENT Consider the ramifications of a single process that is interrupted by a slow or faulty deployment. Products aren't shipped, so customers walk. Invoices can't be created, so bills don't get paid. Tier one solutions can drag down profits and productivity because implementations are typically long and very complex, thus carrying more financial risk. Moreover, Nucleus Research found that Omicron improved cash flow by $100,000 per year by gaining greater visibility and control over its collection process. This was just one of a number of areas where the company saved thousands of dollars with MBS.

PAYBACK In the Omicron study, Nucleus Research found that the company achieved payback in just three months. According to Nucleus Research's Quirk, MBS solutions are faster to deploy due to IT's familiarity with–and end user acceptance of–Microsoft technology. Forgent's Rondini agrees, "Coming off a large ERP implementation, the payback [for MBS] is very quick."

ROI CASE STUDY

Southern Star Concrete Inc.

Southern Star Concrete Inc. developed an IT strategy that included a switch from its existing J.D. Edwards solution. The company frankly didn't have the staff or budget to support such a system. Southern Star chose MBS because it offered the required functionality at a fraction of the cost of deploying its tier one competitor. With a lot riding on business continuity, the company commenced deployment on October 1, 2004, and went live two months later. "We did our first payroll on January 1, and there wasn't a single glitch," reports David Marr, acting CIO responsible for the project. In a mere three months, this midmarket company was enjoying returns on its MBS investment.

SCALABLE FOR AMBITIOUS GROWTH "We needed our system to scale with our [business] ambitions," says Marr. **"The claim that MBS cannot scale in large ERP implementations certainly has not borne out, and we expect the system to grow right along with Southern Star."** MBS performs transaction processing quickly and efficiently. According to Microsoft testing, a large telecommunications company imports more than one million receivables transactions a month, and a wholesale distributor controls in excess of 200,000 inventory items using MBS. It was Microsoft's development road map for MBS that convinced Southern Star Concrete of its commitment to the midmarket.

TECHNOLOGY PLATFORM FOR BUSINESS PROCESSES When everything else seems equal, companies need to look at the technology platform that drives their mission-critical business solutions. Is it solid? Is it poised for future development? How much training is required? What kind of upheaval would it bring to the business? If the users are already Microsoft-savvy and the IT staff knows .Net, the right solution is MBS. Tight integration of business solutions with Microsoft Office applications is automating business processes down to the individual employee level. For example, using Microsoft Smart Tags, users can type a customer's name into a Word document to instantly display that customer's outstanding balance, recent purchases and other information. "The result is greater efficiency all the way around," says ePartners' Duffy.

LONG-TERM PARTNER RELATIONSHIP Any software partner you choose should have a proven track record of success and be viewed as a viable long-term partner. But uncertainty about merger and acquisition activity is rife in the industry **—just look at Oracle/PeopleSoft/J.D. Edwards. Is Oracle now too big to care about the upper midmarket? Will promises to acquired customers be honored? Will acquired products be cycled out, leaving customers empty-handed? These are tough questions, and the answers will be even tougher to gauge. The sure route is to bet on a company that is likely to withstand the threat and uncertainty of a merger or acquisition.**

MBS VS. TIER ONE SOLUTIONS

Switch, Save and Succeed

ERP and other critical business applications have been around for a long time. In the early years, many business leaders felt forced to make solution decisions simply to avoid Y2K problems. Since then, few executives have looked back. Now is the time for these leaders to evaluate the economic impact–both positive and negative–that these solutions have had and continue to have on their business.

Forgent Networks, Southern Star Concrete, Gibson Musical Instruments and many other leading companies have done just that and are benefiting from making the switch to Microsoft Business Solutions. At the same time, hundreds of other companies such as EarthLink and the American Stock Exchange have evaluated and chosen MBS over tier one solutions.

"We are seeing more and more companies step up to the plate and evaluate alternative business solutions to dramatically increase business productivity, agility and profitability," says ePartners' Duffy.

The entire process starts with the right plan. Nucleus Research's Quirk says, "ROI expectations can be met more so if the proper planning and preparation takes place." To this end, ePartners takes its clients through a two-day assessment and deep C-level planning session. "We align existing and planned technology spending with broader corporate strategies, resulting in a multiyear technology investment and ROI road map," Duffy says. "Through our facilitated and collaborative yet highly-structured planning methodology, we guide executives through a decision-making process that ensures ROI and TCO results meet the company's overall business and financial performance goals."

When all the planning is said and done, many companies are making the switch to MBS. These solutions offer the right functionality, for a fraction of the cost–with the added benefit of technology and consulting partners that are in it for the long haul.

"As a senior executive, you owe it to your stakeholders to evaluate MBS and even compare it to your existing critical business solutions," concludes ePartners' Duffy. "A proper evaluation will ensure that you make the appropriate investment while reaping maximum rewards."

Learn From Experience

Looking for more real-life experiences with MBS? Documented case studies of Gibson Musical Instruments, Earthlink, and ChevronTexaco detailing why these companies chose MBS can be found at www.epartnersolutions.com/switch.

About ePartners

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WHO KNOWS WHOM, AND WHO KNOWS WHAT

Employees' personal connections can be as valuable as their individual knowledge base. Social network analysis helps maximize a company's collective smarts.

BY SUSANNAH PATTON

At first glance, it looked like your typical networking event. Three hundred research scientists from packaged-food giant Mars gathered in a Las Vegas ballroom last June, wearing name tags and working the floor. But instead of discussing the latest in M&M packaging or pet food nutrition, the scientists were roaming the room like a band of eager salespeople. Their RFID-enabled name tags lit up each time they met someone they didn't know, and their eyes widened as they watched diagrams of their social networks form on giant screens at one end of the ballroom. The diagrams expanded like giant molecules each time a manager spoke with a person new to him or her. To encourage the networking, Mars promised prizes to those with the most contacts or "points." The scientists—a largely introverted group from separate divisions in Los Angeles and New Jersey—were moving in a blur of handshakes, nods and cards changing hands.

Welcome to social networking for geeks. This particular exercise followed a yearlong study of social networks in Mars's sprawling research and development division. Top executives there wanted to improve the company's ability to innovate and were concerned that their scientists weren't networking enough with outside colleagues. To find out who was working with whom and how scien-

Reader ROI

- Why social network analysis is taking off
- How it is helping companies identify "experts" before they retire
- How to capture social networking data without alienating employees

tists were getting new ideas, they decided to map the group's professional contacts using a process called social network analysis (SNA). In an online survey, R&D managers were asked to name the 15 people they work most closely with and whom they go to for advice, as well as further details of their professional network. Working with Rob Cross, assistant professor of business at the University of Virginia and SNA expert, the company was able to map the network and examine data on how the scientists work—and don't work—together.

John Helferich, senior R&D vice president for Masterfoods USA, says Mars has used the SNA results to sort out relationships among key researchers. The company has determined, for instance, which scientists were overburdened (too many people were going to them for help) and is working on eliminating the need to go to senior people to get approval for things. "This speeds up innovation," Helferich says.

Companies that have been frustrated by traditional knowledge management efforts, such as Mars, are increasingly looking for ways to find out how knowledge flows through their organizations. Looking at the company org chart, it turns out, often doesn't tell the real story about who holds influence, who gives the best advice and how employees are sharing information critical for success. This all takes on greater urgency as millions of baby boomers prepare to retire over the coming decade. Social network analysis provides a clear picture of the ways that far-flung employees and divisions are working together, and can help companies identify key experts in the organization.

"SNA identifies the go-to experts and can help companies find the technical knowledge within their organization needed to develop a new drug, launch a new product and stay ahead of the competition," says David DeLong, author of *Lost Knowledge: Confronting the Threat of an Aging Workforce* and a researcher at MIT's AgeLab.

SNA isn't a replacement for traditional KM tools such as knowledge databases or portals, but it can provide companies with a starting point or blueprint for how best to proceed with KM initiatives. And SNA alone can't always provide crucial information about why people behave as they do, says Hal King, CEO of market research company King, Brown & Partners. "SNA as a KM tool is basically a monodimensional analysis that still needs to be supplemented by demographics, and most importantly, attitudes," says King. As a component to a larger KM strategy, however, SNA can help companies identify key leaders and then set up mechanisms—such as "communities of practice" or other groups—so that those leaders can pass on their knowledge to colleagues.

PEELING THE RELATIONSHIP ONION

Social network analysis can track e-mail and uncover relationships that don't always make it into centralized contact databases

Like most law firms, Orrick, Herrington & Sutcliffe is looking for ways to expand its client base at a time when many large companies are cutting back on their legal expenses. One way to do that, says the firm's CIO, Patrick Tisdale, is to encourage its 700 lawyers around the globe to share client contacts. "We have to assume that business is not going to fall in our laps," Tisdale says.

The problem, according to Tisdale, is that while attorneys are often glad to share information, they are unlikely to do so if it takes extra time and effort to plug the information into a database. In order to boost information-sharing efforts, San Francisco-based Orrick is trying out a type of social network analysis software that tracks whom employees are sending e-mails to. The software can reveal hidden relationships that don't always make it into traditional contact databases.

Tisdale says he is still evaluating the software from Visible Path, but that he can see the business value. The software allows the firm to harvest e-mail contacts into a database and analyze how attorneys are networking with clients. Attorneys can also use the software when they are looking for contact information for potential clients. For example, if an attorney is trying to get in touch with former GE CEO Jack Welch, he or she can plug that name into a search window, and the software will identify people in the firm who have direct or secondhand relationships with Welch. (The names of these individuals are not known to the searcher; they are identified only by a code.) The searching attorney can then e-mail the anonymous person who appears to have the most direct relationship with Welch. Those who receive the e-mail have three choices: They can decline with anonymity; they can identify themselves and decline; or they can provide the contact information.

E-mail tracking, of course, doesn't take into account important face-to-face meetings. And some may not be willing to take the time to respond to queries from colleagues.

Even so, Tisdale says, "Law firms have to be more sophisticated now in analyzing the markets they want to participate in." –*S.P.*

SNA Goes Corporate

Social network analysis got its start as a social theory developed by scientists in the 1930s who were exploring social patterns. One of those researchers, a New York City psychiatrist named Jacob Moreno, is often credited with inventing the "sociogram," a diagram of points and lines designed to illustrate relationships and social interactions among people. Scientists and mathematicians built on these ideas over several decades, investigating ways in which people get jobs, become leaders and develop friendships. They then mapped the flow of information through social networks. From the start, SNA has attracted philosophers, sociologists and statisticians looking to analyze human relationships in a mathematical and visual way.

According to Valdis Krebs, an SNA guru who worked with IBM and started his own SNA software company called Orgnet.com, SNA can be defined as "the mapping and measuring of relationships and flows between people, groups, organizations, computers, or other information- or knowledge-processing entities."

Over the past several years, with help from Krebs and other SNA believers, the corporate world has been waking up to the uses for this once arcane social science. Some of the interest stems from disappointment with efforts to build knowledge management databases that were largely ignored by employees. "We're seeing that companies want to have a picture of who the key knowledge brokers are in their organization," says Cross. "The rise of blogs, online support sites and social networking sites—such as Friendster and LinkedIn—have also helped raise SNA's profile."

Social network analysis provides a clear picture of the ways that employees and divisions are working together, and can help companies identify key experts in the organization.

"So many communications are electronic these days that it has become much easier to record who is talking to whom," says Stanley Wasserman, professor of sociology, psychology and statistics at Indiana University and chief scientist for Visible Path, a software company devoted to analyzing social networks. "It's a natural thing to examine these networks and try to make sense of them."

Companies interested in trying SNA can use software that falls into two basic categories: programs that track e-mail and other kinds of electronic communication, and programs that work from data collected via employee surveys. Such surveys typically ask employees to identify their top contacts within and outside the organization, as well as details about who provides good advice and how often they communicate. Companies may come up against some resistance from employees who may not want their networks mapped, but, as Mars was able to do, this resistance can be muted by promising confidentiality on the data supplied and by offering them versions of their "personal networks."

SNA can be a useful diagnostic tool in a wide variety of industries and professions, ranging from law firms to drug companies and financial services companies. But the practice is relatively new in the corporate arena, and finding ROI can be a challenge. "We use it to find out how we are connected," says Vic Gulas, chief people and knowledge officer for environmental and construction consultancy MWH Global. "The challenge is to link actual [company] performance to SNA." Still, there may be strategic and targeted uses in which SNA can make a difference. For example, pharmaceutical companies are using it to help identify key scientists and discover how they are developing ideas for new drugs; government agencies are using the technique to pinpoint top performers who may be close to retirement in order to quickly devise methods to transfer that knowledge; and investment banks are using it to find better ways of serving clients and clinching deals. "Lost knowledge is an invisible problem, so companies don't always see the threat," DeLong says. "SNA makes it visible."

Finding the Gaps

SNA can also make the lack of connections (or collaboration) painfully clear. Two years ago, IT executives at MWH Global looked around at their sprawling, decentralized company and knew they had to make some changes. Over the years, the Denver-based company had expanded through mergers to include 6,000 employees and 150 offices worldwide. Three separate IT organizations worked in different locations in groups dedicated to ERP, IT infrastructure and other large projects. The company decided to reorganize so that all 160 IT employees dedicated to servicing the company's internal IT needs reported to one location. The goal was to break down the silos and get people in Europe, Asia and the Americas talking to each other to improve service and create efficiencies.

But before this reorganization, Gulas, who spearheaded the IT centralization plan, decided to run an SNA to see how the groups were connected. The SNA was completed in September 2003, and the results, he says, clearly showed how the ERP group was cut off from the rest of IT, working in almost complete isolation. The analysis found that there was more collaboration between IT staff in Europe and Asia than within the 20-person ERP division. And because of this isolation, he says, there was little collaboration with users of the ERP software, and the ERP group got a reputation of being hard to work with. "People sometimes don't believe that they are disconnected from the rest of the organization, but in our case, a picture spoke a thousand words," Gulas says.

According to Cross, who helped Gulas map his social network with Web-based software, the technique can help companies such as MWH Global get a sense of who is best connected in the enterprise, as well as who is most overloaded. The results can be surprising. "People are finding disconnects across functional lines, physical distance and even between people working on key projects," says Cross, who is also coauthor of *The Hidden Power of Social Networks*. Some of these are to be expected, but others can cause real damage to an organization.

At Mars, the SNA project uncovered a lack of good communication between the snack food division in New Jersey and the food division in Los Angeles. "We found very few bridges between the two groups, and that lack of communication was leading to duplication of efforts in some areas," says Caroline Ruzicka, who was then group research and development manager for Masterfoods

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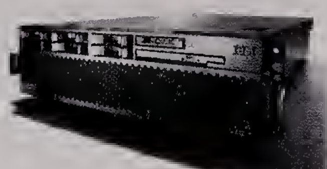

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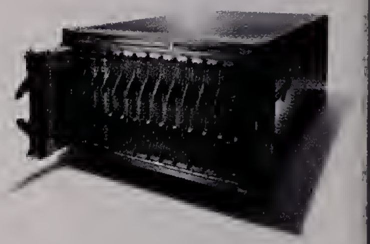

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USA, a division of Mars, and has since left the company. Clear evidence of this lack of communication also spurred company efforts to fix the problem. Now, employees are expected to keep in touch with certain colleagues, and their performance reviews are based in part on successful networking.

Gulas has also taken steps to correct the problems highlighted by his SNA. Motivated in part by the disconnects it saw on the SNA diagrams, MWH has a plan to reorganize around functional groups instead of regional teams. For example, the company used to have people around the globe working on messaging technologies such as Lotus Domino. But these people were often working independently, with little knowledge of what their counterparts in other countries were doing. Now, there is a single manager overseeing the domain, directing the efforts on a worldwide basis.

> At Mars, the SNA project uncovered a lack of good communication between the snack food division in New Jersey and the food division in Los Angeles.

In order to improve communication in the ERP group, MWH decided to break up the California-based team. The company was in the midst of upgrading the J.D. Edwards software and saw an opportunity to create cross-functional teams, combining people from ERP and other parts of IT, in order to break down barriers. Some of the ERP team members were assigned to the large upgrade project, which also included IT staff from other divisions.

A year after the first SNA, Gulas decided to complete another analysis to measure where progress had been made. The results showed that connectedness and communication improved in the IT group and that "more people knew who was doing what." What's more, the first SNA showed that average IT employees knew 29 people in the organization, while the second showed they knew 39.

As a result of the SNAs, Gulas has helped organize team-building sessions that brought people together from Europe and other parts of the organization who had never met before. He has used the SNA data to identify "strategic knowledge communities" in project management and client service management, which were largely unknown to senior staff. Gulas says his group is performing better after the SNA, and this improved collaboration has contributed to cost savings of about 8 percent. "It's an important tool to help us make sure that people are talking to each other," he says.

Try the Tool Yourself

Want to take social network analysis—the process of mapping links among colleagues—for a test drive? University of Virginia's Rob Cross has provided us with an SNA tool online. To take it for a spin, look for the link to **SNA QUESTIONNAIRE** on the online version of this story or at **www.cio.com/061505.**

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Danger: Disappearing Knowledge

If SNA is a good tool to use to find out whom people are going to for information, it can also help flag a potential problem if a lot of those "experts" are about to retire. That's a pressing problem given that, by 2010, more than half of all workers in the United States will be over 40—and that tens of millions of baby boomers turn 60 this year and will be contemplating retirement in the coming years. By mapping the social networks in their organizations, companies can find out ahead of time who has necessary knowledge and create ways of transferring it to younger employees before it's too late.

In one case, the central IT unit in the Canadian government, with a staff of 1,600, decided to do an SNA to establish which skills they should retain and develop. The IT group, which provides IT services to most of the Canadian government, made the move because they expected to lose 40 percent of senior managers to retirement within five years. Using SNA software from Knetmap, the agency was able to determine who had the most important knowledge and experience, and it was better equipped to start succession planning.

Even if succession planning isn't at the top of your agenda, data from an SNA can be used to help motivate your current staff. At Mars's Las Vegas meeting, the scientists were given a booklet mapping their own personal network as well as ideas on how to expand it. Later, they were encouraged to network outside the organization in order to increase possibilities for new ideas at the company. Now, networking has been built into the development and performance review process, and scientists have to set goals on expanding their networks.

Mars executives acknowledged that the data from SNAs can be sensitive, particularly when it comes to employee performance. Those who turn out to be highly connected are often high performers, and conversely, those with few connections often are not performing as well. "We looked at the outliers to figure out why they were isolated," Ruzicka says.

Initially, some of the scientists were reluctant to respond to the surveys. But because Mars officials were discreet with the results—Ruzicka and Helferich were the only ones who saw the results (about who was an outlier, for instance)—and because they didn't use the data in a punitive way, the scientists ended up embracing the project.

"When people got their own network profile, they came away energized to do more networking," Ruzicka says. "In the end, what we're doing is trying to retain people and increase innovation."

Senior Writer Susannah Patton can be reached at *spatton@cio.com.*

A SUPPLEMENT TO IDG PUBLICATIONS

Bridging the IT and Business Needs Gap

Keys to Successful Business Intelligence Deployment | By Dan Vesset

The evolution of information technology (IT) is continually producing new tools for productivity enhancement. Business intelligence (BI) tools and applications, for instance, have undergone several generations of improvements, but research into the BI market suggests that considerable productivity can still be tapped by implementing currently available BI software. The business need for such tools is more pressing than ever, and so is the challenge to IT departments to get BI implementations right. ▶

IDC
Analyze the Future

The Pillars of Decision-Process Automation

IDC's research has shown that organizations derive two primary benefits from BI projects: productivity gains and business process enhancements. These two primary benefits can be achieved by selecting BI tools that address the following four major variables in decision making, which in turn can lead to sustained competitive advantage:

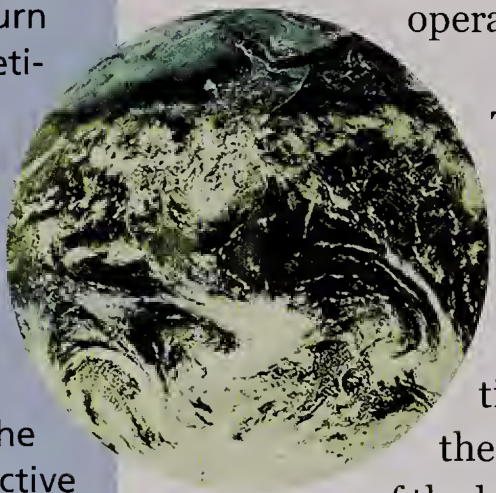
- Speed
- Accuracy
- Insight
- Relevance

Speed and accuracy of decision making are the primary contributors to increased productivity. On the other hand, advanced predictive and descriptive analytics, as manifested in the insight and relevance of decision making, contribute actively to business process enhancements.

Competitive advantage comes from the speed and accuracy of decision making, as well as from assessing the relevance of information to a decision and from gaining insight in seeking and evaluating possible decision alternatives. Because many types of decisions are recurring or repeatable (such as pricing, extending credit or allocating resources), decision-making processes exist that are amenable to automation.

However, decision process automation is achievable only when all four variables outlined above are used in software architectures that support decision making.

IDC defines business intelligence software as the software that supports speed, accuracy, relevance and insight in decision making. BI, in turn, is a segment of the broader business analytics market that includes tools for data integration, data warehouse management, query and reporting, data mining, technical data analysis, and spatial information management as well as prepackaged applications for customer relationship management (CRM); financial, business performance management; supply chain; and operational analytics.



The need for these software solutions has never been greater. For instance, data published last year by the U.S. Department of Labor has shown a slowdown in productivity, which suggests that perhaps the low-hanging fruit of the excesses of the late 1990s has been picked, and therefore businesses need to find new ways to increase productivity if they hope to gain competitive advantage.

A new investment cycle in productivity-enhancing tools appears imminent, and current investment trends in BI software support this conclusion. In 2004, the BI tools market experienced better-than-expected performance, growing by 9.5% to reach $4.25 billion in worldwide software revenue. IDC forecasts a 2004–2009 compound annual growth rate (CAGR) of 6.0%, which reflects some changes in the underlying market, such as a shift in software sales from BI tools to packaged analytic applications and database-embedded BI components. IDC estimates that the broader business analytics market reached $14.5 billion in 2004.

Critical Misalignment

Despite a healthy adoption rate, however, the deployment of software to support decision-making processes continues to lag significantly behind the money that companies spend on software to process transactions. IDC research shows that for every dollar spent on transaction processing applications or capturing and getting data into databases, only $0.25 is spent on getting the data out for business analytics to support decision-making and statutory reporting processes.

The result is a critical misalignment between business needs and the information technology intended to serve those needs. For example, a recent IDC survey revealed that only about 10% of business managers feel very confident with the statement that the reports developed in their organizations deliver relevant information to the right people at the right time. About 40% of the managers surveyed reported feeling not at all confident or only somewhat confident.

Although the misalignment between IT and business is ultimately a business problem, IT managers must address several distinct IT challenges to successfully implement and support BI:

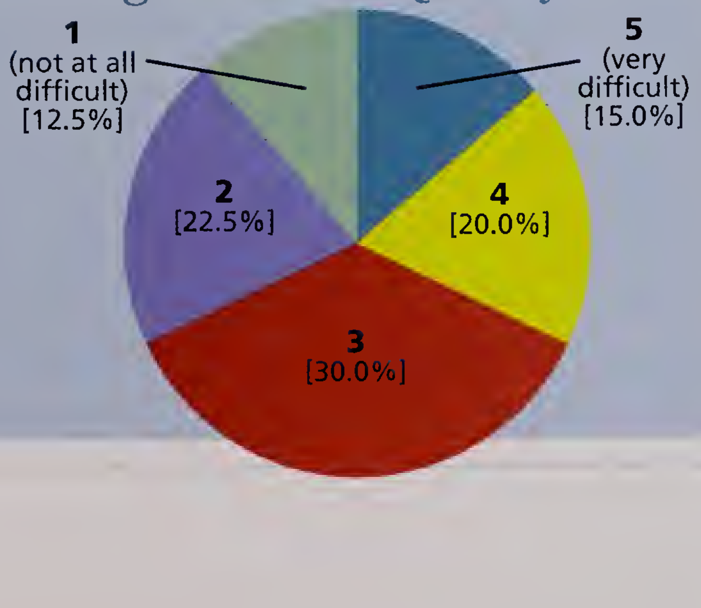
▶ **Defining system requirements.** BI implementation is often a vague and iterative process because of the difficulty in determining in advance all the information forms that users want—the type of reports or the alerts for certain kinds of information. Usually the BI system is replacing a relatively manual data-tracking process that may employ an Excel spreadsheet, for example. So after the new BI system is online, users begin asking for more—more data sources, more different kinds of reports, more key performance indicators (KPIs). Each of these requests needs to go through the IT department, and while some are relatively easy to implement, others take more time and testing. Unlike other IT systems, such as financial applications that remain comparatively static following implementation, BI systems are dynamic and continually evolving.

▶**Transforming disparate data into a single model.** All the information that populates user "dashboards" and "scorecards"—the BI interfaces—must be brought in from different systems and molded into a single data model. This is a complex data transformation task. For example, IDC has found that in BI projects for CRM systems, 70% of the work is just around sourcing and mapping the data—before the information can be accessed and distributed. A related issue is

Challenge of Maintaining Business Intelligence Data Quality

Using a 5-point scale, where 5 is "very difficult" and 1 is "not at all difficult," please rate the difficulty of maintaining business intelligence data quality.

n=40



Source: IDC, 2005

This article is abstracted from a forthcoming white paper by IDC, commissioned by Oracle and titled "The State of Business Analytics—Best Practices, Benefits, Challenges and Shortcomings."

To read the entire white paper, log on to **www.idgpartners.com/oracle/print**

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maintaining data quality, which according to a recent IDC survey, is an ongoing challenge. A full 35% of survey respondents said that data quality maintenance is either "very difficult" or "difficult," versus only 12.5% who answered "not at all difficult" (see chart, page 3).

▶**Managing user expectation/experience.** Users often expect to get a lot of data immediately and to have the system solve tough business problems. As described earlier, BI system development is inherently iterative, complex, and ongoing. Furthermore, while BI is being extended to address decision-making processes, the types of decisions for which the technology is best suited tend to be operational decisions that are foreseeable and repeatable—decisions that employees have to make on a regular basis. BI will not necessarily hand users their next big idea, such as the creation of a new product. Moreover, although 70% of respondents to a recent IDC survey said that existing BI systems let them effectively make operational decisions, 30% of organizations still have systems that don't allow for effective operational decisions.

▶**Guaranteeing system availability.** BI is not just for executives anymore. Increasing numbers of line-of-business managers and lower-level employees are accessing BI systems to make important decisions as part of their normal duties. BI usage is, in effect, reflecting a larger business trend toward decentralization, the flattening of organizational hierarchies, and increased decision-making responsibility for front-line workers. As BI follows this trend, it becomes more operational, and while BI isn't yet on a par with transaction processing systems, it's clearly getting there. Downtime on transaction processing systems is intolerable, and it's increasingly less tolerated on BI systems. This indicates that BI has become truly integrated in the business processes of many companies. IT managers can expect this trend to grow with the advent of real-time information delivery; as BI information becomes more time-sensitive, system downtime becomes a bigger problem. ●

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digital
asset
management

FROM TAPES TO BITS

[before]

WGBH IT Director **Amy Rantanen** and Chief Technologist **Dave MacCarn**'s asset management efforts moved the TV station from endless shelves of tapes (left) to more easily managed digital data.

PHOTOGRAPHY BY STEVEN VOTE

With a mix of promises, concessions and trade-offs, public broadcaster WGBH convinced a bevy of vendors to create a reference architecture for digital asset management

BY MERIDITH LEVINSON

When terrorists demolished the twin towers on September 11, 2001, producers of the PBS documentary program *Frontline* needed to quickly create shows about al-Qaida. They had footage of Osama bin Laden from previous broadcasts, but it was on videotapes and CDs stored in cardboard boxes on library shelves. As a result, archivists spent 625 hours over a period of two months fielding producers' requests for material, finding it and then reshelving it.

The same problem can plague other organizations where marketing departments struggle to keep track of logos, product photos, PowerPoint presentations, webcasts and press releases. And the inability to track such assets efficiently often leads to wasted effort and higher costs. To solve the problem, some organizations are turning to digital asset management (DAM) systems, a combination of hardware and software that serves as a centralized catalog for audio, video, text and images.

For 11 years, WGBH, the public television station in Boston where *Frontline* is produced, had struggled to create a DAM system that integrated with the rest of the

Reader ROI

- :: How WGBH convinced vendors to help it build a reference architecture for DAM
- :: Concessions the station was forced to make to reach its goals
- :: How to work with and apply pressure to vendors to get what you need

organization's workflows and production technology. But when WGBH started the effort, standards for digitization were just emerging, according to David Yockelson, a vice president and distinguished analyst with Gartner, who covers DAM. And hardware didn't have enough power to deal with the 2 terabytes of new content that broadcasters such as WGBH generate daily. All of this made for a Herculean task for the small broadcaster, which didn't have the IT staff or the funding for such an intensive undertaking. Even now, WGBH has just 22 IT workers and an IT budget of $4.2 million.

But WGBH is in a much different position today thanks to partnerships it forged in 2000 with companies such as Sun Microsystems, OpenText (a provider of collaboration and content management software that purchased DAM system provider Artesia in August 2004), and a variety of other vendors in the digital media and broadcasting space to create an open, standards-based reference architecture for DAM. The reference architecture serves as a manual not only for public broadcasters but for any organization with the need to manage rich media, including government and educational organizations, advertising agencies, Web and print publishers, retailers and manufacturers. The reference architecture is available for free to anyone who wants to view it, as long as he signs a nondisclosure agreement to protect Sun's intellectual property. The first version of the reference architecture was published in April 2003, and a second version that features more vendor partners, more storage connectivity, more support for different file types, and the ability to monitor and track contracts and rights came exactly two years later.

Because of this partnership, the public broadcaster has a DAM system that integrates with its editing, production, trafficking and broadcast systems, and that gives WGBH employees Web-based access to millions of content files. The DAM system enables WGBH to share its content internally and with other public TV stations and educational institutions, and to deliver its content via more distribution channels and in more customized ways to viewers and station members. At WGBH, the DAM system is capable of distributing data at a rate of 20MBps to 30MBps to individual PBS stations. IDC (a sister company to *CIO*'s publisher) did an extensive study of the implementation and predicts that WGBH may be able to improve production efficiency by as much as 40 percent.

This small organization that relies on public generosity and government funding to sustain itself convinced a group of vendors to share proprietary information and devote staff and equipment on its behalf to create this system by catering to vendors' bottom lines, playing them off their competition, getting buy-in from the vendor CEOs and by leveraging its expertise in broadcasting and its reputation as one of the most highly respected TV stations in the United States. Those are tactics most companies can exploit when negotiating with vendors, especially when, like WGBH, they want to be an early adopter of a leading-edge technology that will give them a competitive advantage. But the effort wasn't completely one-sided. WGBH had to make some dubious concessions too—trade-offs that may not have caused the TV station much pain, but ones that a public company would be hard-pressed to duplicate. In the end, WGBH got the DAM system it had been trying to build for years and, in the process, helped create an architecture that has already been adopted by New York public TV station WNET, Milwaukee Public Television, Comcast and Major League Baseball.

Sorting Out the DAM Thing

It's a confusing concept. However, Dave MacCarn, WGBH's chief technologist and asset management architect, has shared with online readers his PowerPoint presentation of the broadcaster's **DAM SYSTEM**. Find the link at the online version of this story or at **www.cio.com/061505**.

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COMPONENTS OF A DAM SYSTEM

There are two fundamental elements of a digital asset management (DAM) system. They are the asset repository and the meta-data database. The asset repository can be anything from the hard drive on one's PC to a hierarchical storage management system. At Boston-based public television station WGBH, it's a hierarchical storage management system provided by Sun Microsystems. The meta-data database recognizes different file types such as .doc, .jpeg, .ppt, .quark, .tif and so on, and indexes the contents of those file types. WGBH uses Artesia (now owned by OpenText), which recognizes 400 file types and is based on the Dublin Core Meta-data Standard. Most corporations would need only the asset repository and the meta-data database. The Artesia system features an export function that lets users e-mail content directly from the DAM system. This feature isn't suitable for video but appropriate for documents, static images and PowerPoint presentations.

The other critical component of a DAM system is a mechanism for identifying material and getting it into the repository. This process is called ingest and could be manual, with a person sitting at a computer dragging and dropping files into the system, or automated with a software program.

The reference architecture also features systems for logging, transcoding and distributing content. A broadcaster or an entertainment company, for example, will need logging tools for capturing key frames in a video so that employees don't have to stream the whole piece to see what it's about. Logging tools detect scene changes and define the segments of the video with meta-data. Transcoding switches the formats of content to make it more easily distributed and used. Video stored at acquisition bandwidth, for example, is too space-consuming for broadcasters to distribute unmodified. It has to be transcoded into, say, a smaller, more transportable QuickTime format. Distribution is the final element of the reference architecture. It's the way that WGBH gets *Frontline* broadcast at PBS stations across the country. *–M.L.*

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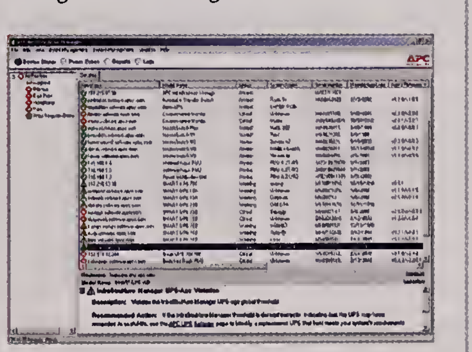
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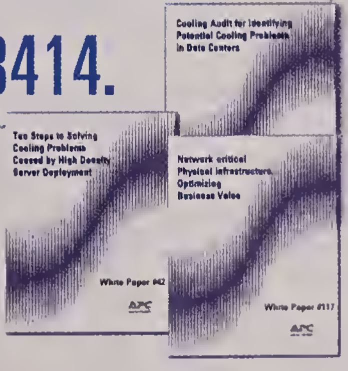
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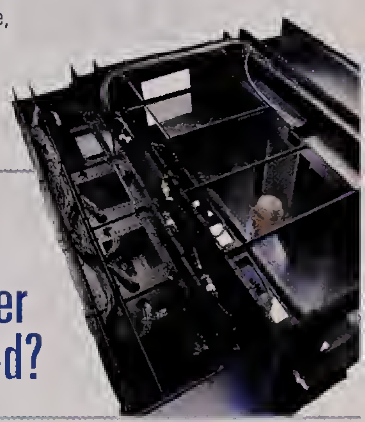

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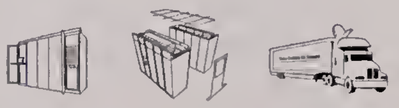
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Quid Pro Back Scratch

When Dave MacCarn, WGBH's chief technologist and asset management architect, began evaluating DAM technologies in the mid-1990s, he spoke with several vendors, including IBM, EMC and Silicon Graphics. They all offered solutions but with hefty price tags that the public broadcaster couldn't afford. His colleague, WGBH Director of Information Technology and Asset Management Amy Rantanen, met with some Sun executives at a conference for broadcasters in 2000 and told them about the work WGBH had done speccing out a DAM system and about the challenges WGBH faced getting funding for such a system, and she asked Sun for help.

The timing of her request was fortuitous because Sun was looking to enter the digital media and broadcasting space. In 2000, DAM was receiving a lot of hype as a technology category on the brink of explosion. Back then, IDC predicted that spending on software for rich media asset management would grow from $117 million in 2000 to $1.8 billion in 2005. (It hasn't yet, thanks largely to DAM's continued complexity and high price tag. A 2004 IDC study revised the DAM market to top out at just under $435 million in 2005.) Meanwhile, Sun's biggest competitor, IBM, had long offered digital media management products and devoted a division to it in 2001. To jump-start its own program, Sun agreed to pony up free professional services and equipment if WGBH would help the vendor build a reference architecture for DAM. "Developing a reference architecture is an opportunity for a vendor to figure out what is necessary to make the architecture replicable and affordable to a larger number of clients," says Forrester principal analyst Robert Markham. "That's why Sun was willing to do this." (Indeed, IBM has its own reference architecture—or "open framework"—for digital media.)

Working with Sun to create a reference architecture fit the public broadcaster's mission to share knowledge, but the effort would slow WGBH's goal of getting a DAM installed because it would need to test a variety of products for interoperability, even if the station had no plans to use those products. In the end, Sun's offer of free hardware and consulting (combined with Sun's long-standing support for open standards and the station's existing six-year relationship with the vendor) convinced WGBH to go along with the plan.

Even in the midst of Sun's widely reported financial and market share difficulties, the vendor continued to support and devote resources to the project, says Rantanen, albeit fewer than when the effort began. She and MacCarn also say they felt that they knew enough about DAM to continue the effort with another vendor if they ever needed to port the system to another hardware platform. But with Sun quadrupling the number of sales, marketing and engineering staff working on the project between January and April 2005, it doesn't look like WGBH should be concerned about Sun's commitment to the project for the time being.

WORK WITH ME, BABY

Five tips for getting vendors to do what you want

1. Appeal to a vendor's bottom line—that is, their need to sell their products.
2. Leverage your strengths and the strength of your company's reputation.
3. Dangle your know-how like a carrot.
4. Apply torque from the top by meeting with the vendor's senior executives.
5. Play them off their competitors.

–M.L.

Center of Attention

Of course, WGBH had to make its own commitment. Sun handed over software and servers, but in return, it took ownership of some of WGBH's intellectual property—including the detailed functional specifications and requirements document for the DAM system that Rantanen and MacCarn had spent years drawing up, and software tools they had developed to handle digital files. WGBH also had to share with Sun some of its trade secrets, including its processes for producing a TV show and its workflows—information, MacCarn says, WGBH certainly wouldn't give out to, say, The Discovery Channel but which Sun would be allowed to work into solutions for the broadcast space.

And there was another string. WGBH had to let Sun set up a customer demo center—a Sun iForce Center—in one of the broadcaster's conference rooms. This is the first iForce Center ever established at a customer's site; the 70 other iForce Centers are located either on Sun's property or in a technology partner's facility. While Sun covers the cost of the center and arranges most of the meetings that take place there, WGBH staff such as Rantanen and MacCarn have to take time out of their day to show potential customers how the technology works. Rantanen and MacCarn say on average two prospects tour the center each month, with most visits taking about four hours. They say the iForce Center gives WGBH the opportunity to commiserate with, learn from and share best practices with the other organizations. "We don't look at it from [the perspective of doing marketing for Sun]," says Rantanen. "As long as we can further our enterprise DAM initiative internally and benefit from discussions with other customers, from the professional services, from the lab equipment we're using for testing, and don't have to put huge amounts of resource time into [the iForce meetings], it's definitely in our best interest to participate."

Never would any of these trade-offs fly inside a for-profit company, according to Forrester's Markham. After all, public companies rely on their intellectual property to compete, and they don't like to get too chummy with their suppliers. "Businesses try to distance themselves from their vendors. When they're renegotiating a contract, the further they are from a vendor, the easier it is negotiate lower prices and keep the competition open," says Markham.

Nevertheless, Markham notes a valuable lesson that for-profit companies can learn from WGBH's effort. "If you have a strategic vision that's important to your business, and if you can find companies that are on the leading edge of a technology and that can help you fulfill your business strategy, it pays to be an early adopter," he says. "There are pains involved

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in it, but in many cases, what you learn through that adoption, and the fact that you're working with a company that is pouring a lot of resources into it and willing to negotiate very fair pricing for the technology, can really give you a leg up on your competition."

One benefit WGBH has seen from this effort that it didn't anticipate was increased support from station management for the creation and implementation of the DAM system. MacCarn says the partnerships WGBH struck with technology companies and the fact that the reference architecture is gaining momentum have given the IT department's credibility a substantial boost inside the station—and have helped with the change management effort necessary to make DAM implementations successful. Says MacCarn, "If other companies adopt what we're doing, our IT projects are seen in a better light inside our organization."

The partnership WGBH struck with Sun and the fact that the reference architecture is gaining momentum has given the IT department's credibility a substantial boost inside the station.

All Aboard the Gravy Train

Getting vendors to see the value of participating in building the reference architecture was not hard, says Rantanen, especially since WGBH was already a customer of many of these vendors.

Artesia, which was already one of Sun's partners in 2000, got involved when the public broadcaster invited the DAM vendor to its office late in 2000 to discuss its plans. Artesia saw that WGBH had put considerable thought into the system and the workflows and that, like Sun, Artesia had much to learn from WGBH about broadcasters' needs for DAM. As a result, Artesia offered WGBH generous discounts on its products.

Grass Valley, Telestream and Virage were also eager to participate because they saw WGBH as a potential avenue for getting products installed at other PBS stations. But to be part of this reference architecture, vendors had to commit to ensuring that all current and future products and versions of products would interoperate with the other technologies in the architecture, plus they also had to donate products to the iForce Center and occasionally send technical staff there to test and tweak the products.

For companies whose products were open and integrated easily with other technologies, this wasn't an issue. But many broadcasting technologies don't interoperate well, whether deliberately or not, says Ken Devine, CTO of New York's WNET. Getting the vendors of those products to devote development staff and products to the iForce Center for testing and integration has proven more challenging. Production system maker Avid Technology, for instance, has yet to devote hardware, software or developers to the effort, forcing WGBH to integrate Avid products on its own through stopgaps such as file wrappers and transcoders that convert from Avid's proprietary file formats to standard ones.

According to Avid, the fact that WGBH was able to integrate its products into the reference architecture on its own is evidence that Avid's products are easy to integrate. But Rantanen and MacCarn would prefer that companies adopting the reference architecture and Avid products need not go through the extra steps currently required to make Avid a part of the system.

In response, Rantanen says she and MacCarn have been trying to "wrestle Avid to the ground." They meet with Avid CEO David Krall every six months or so in a practice that WNET's Devine (who also attends the meetings but who wouldn't name vendors) refers to as "applying torque from the top." In the meetings, they try to convince the company that it will sell more products if it interoperates. They cite conversations they've had with other Avid customers in which those customers have said they wished Avid supported more open formats. And they mention the smaller vendors trying to make it in Avid's space that would fall over themselves to be cited as fully integrated in the reference architecture.

Rantanen and MacCarn say they're seeing some progress. "We've just now seen this past year some third parties like Telestream being able to support Avid formats so that there's somebody other than Avid that can do some of this converting," says MacCarn. "That's a good sign."

They also add that Avid has become more cooperative since WGBH got one of its competitors, Apple, to join the effort.

And as the reference architecture picks up steam, Rantanen says it's becoming easier to get more vendors involved. "We have this illustrative group of referenced vendors, and now people don't want to be left out." CIO

Senior Writer Meridith Levinson can be reached at *mlevinson@cio.com*.

WHO GETS WHAT

A study in careful compromise

WGBH

» From Sun, WGBH gets professional services, equipment for the iForce Center and lab equipment it can use for its own internal testing, publicity as a technology leader in broadcasting, and a reference architecture specifically tailored to its work environment.

SUN

» From WGBH, Sun takes ownership of WGBH's intellectual property, gets to associate with a well-respected organization, and receives publicity, sales leads and future business opportunities from organizations who visit the iForce Center. *–M.L.*

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> *DMC Stratex Networks*

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The Resource for Information Executives

in the industry, what your competitors are doing with technology. The other thing is being able to work with the people in the Marriott business so that they can understand what their needs are. Communication is critical. Because it's not easy to measure the returns on investments in technology. It's not like a hotel. There, you know what the investment is, you know what the cash flow is, and you know where it came from.

Given the difficulty of measuring benefits from IT, what do you look for in an IT investment?

You're looking for either how it's going to generate more revenue or how it's going to reduce your costs.

But you said that's hard to show.

It is. It's difficult to separate the value of the technology from the value that our associates, business processes, training or corporate culture provide.

So if you could change one thing about IT, what would it be?

I wish it was easier to measure the actual results of IT. When you're building new systems, you get as much benchmark data as you can about how other companies are using those systems, and you talk to outside parties to get their advice and lessons learned. But often it's difficult to understand why this system costs what it costs. And then, when you're trying to figure out whether you should spend another 10 percent or 15 percent to change or improve it, [the decision] can be very subjective.

The guesswork bothers you?

Yes. You've got customers out there who are challenging you all the time on the costs. We have a lot of franchisees and owners who operate hotels for other brands besides Marriott. That gives them a chance to come back and tell you, We think you could do something cheaper.

We've got to just keep looking for ways to optimize every process and tool to make sure that we're adding more value. [As I mentioned earlier,] we streamlined our finance and accounting functions, moving them to a shared service center in Knoxville. New tools have enabled more efficient workflow management, driven productivity gains and improved the speed of customer billing. Also, process automation and standardization have resulted in savings to properties that exceed their costs for the service center.

We quantify the value that technology brings to this initiative through performance indicators that assess associate and guest satisfaction, cost and service delivery.

Of course, alignment is a two-way street. What is the most important thing the business could do to align itself with IT?

[We're] continually educating people in the business about how IT can help out. It's something we've been doing on the finance side too. We put together some training programs to teach general managers and other key people how the owners of hotels look at a hotel.

So education is the key then. How do you make it happen?

The education process has become a day-to-day way of conducting business, through processes that require collaboration. In addition, Carl Wilson has conducted briefings for senior executives, including myself, on new technologies and trends affecting our industry. These briefings also include information about what our competitors are doing, as well as Marriott's strengths and weaknesses.

What do you do to ensure business accountability for Marriott's IT investments?

We don't go ahead with a project unless somebody in the business has taken responsibility for it, as well as somebody from information resources. That came from when Carl arrived here and looked at some problems we'd had on some projects in the past. It was because nobody really put a stake in the ground from the business side and said, This is what I want. And therefore, the scope kept changing, and the costs of projects kept changing.

Now, whenever there's a project, we make sure that somebody in the business is responsible for it. IT is responsible for making sure it comes in on-time and on-budget, but somebody in the business has to make sure that they're getting what they want. If they decide that they want something different, they have to get the scope reapproved.

PHOTO COURTESY OF MARRIOTT

SNAPSHOT:

Marriott International

HEADQUARTERS:
Washington, D.C.

INDUSTRY:
Hospitality

2004 REVENUE:
$10 billion

EMPLOYEES:
133,000

LOCATIONS:
2,600

I.T. EXECUTIVE:
Carl Wilson, executive VP and CIO

I.T. EMPLOYEES:
1,350

You're in a very cyclical business. Does IT play any role in smoothing the cycles?

If you go through a period like 9/11, when you've got much lower revenue, there can be more pressure to delay a project such as enhancing your reservation system. But with the real big projects—such as putting in our shared service center—we went ahead because it was going to take about a year and a half, two years, and it had big returns.

How do you counter resistance when money is low and people want to wait to do IT projects?

In times like that, technology is often something that can help give you a competitive advantage, but sometimes you have to sell IT a little harder.

We provide information on the business value that a new tool is expected to provide. By promoting transparency of information, we believe we facilitate the decision-making process and overcome potential challenges before they arise. CIO

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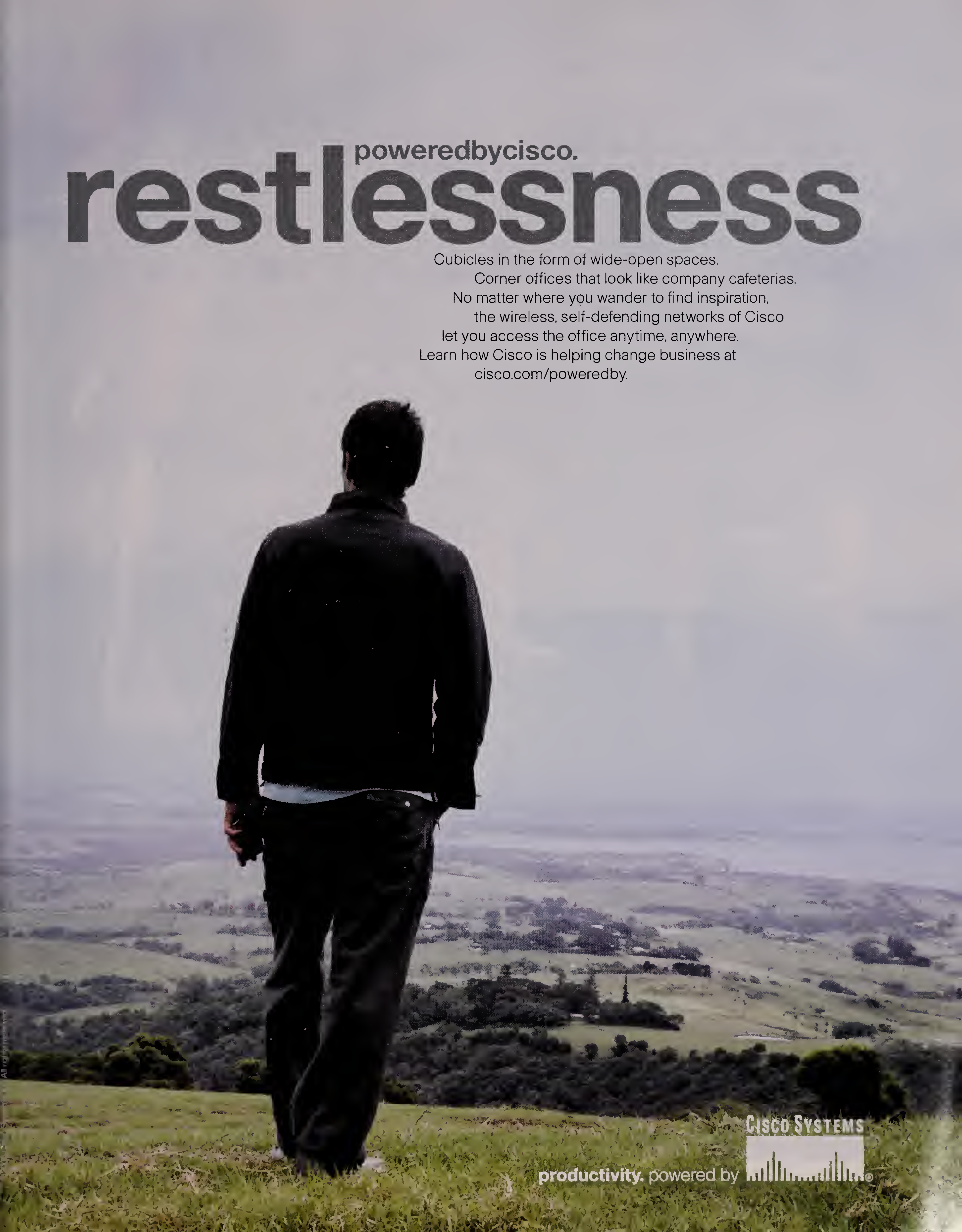

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United Technologies Corp. CIO John Doucette (foreground) created the 27-month IT Leadership Program to accelerate the learning of entry-level IT trainees, including (left to right) Nasanna Tam, Rahul Krishnan, Rashaun Ashley, Chris Bardi and Grace Chen.

THE KIDS ARE ALL RIGHT

Three CIOs have bucked economic trends and set up training programs for entry-level IT staff

BY
THOMAS
WAILGUM

PHOTO BY STEVEN VOTE

DICK LEFAVE AND JOHN DOUCETTE SEE VALUE where few CIOs are even bothering to look these days: entry-level IT staff. Nextel's LeFave and United Technologies Corp.'s Doucette have recently instituted IT entry-level recruiting and training programs at their companies.

To figure out why they do, go back and take a look at their first IT jobs. Both received formal and informal mentoring and training during their formative years. LeFave got his start at Boeing, learning the craft from well-trained engineers willing to share their knowledge. "Boeing provided a mentoring process and many opportunities to learn from engineers with 30 years of experience," LeFave says. "That's where you really learned."

Doucette's early IT experiences in General Electric's information management program "gave me a great technical foundation to build from," he recalls. He explored the various departments of one of GE's business units during an intensive two-year IT training program.

Reader ROI

- Why some CIOs still find value in training entry-level IT staffers
- How different entry-level training programs are structured
- How entry-level training can complement an outsourcing policy

So it's not surprising to hear the two sermonize about the philosophical and societal importance of giving the next generation of IT newbies a helping hand. United Technologies Corp. (UTC) immerses new IT staffers in a whopping 27 months of work in UTC's seven operating units. Nextel offers six weeks of IT and business schooling and mentoring within its departments.

These kinds of training programs are increasingly rare in this age of outsourcing and cost control, in which many CIOs see no future in developing the next generation of IT leaders. According to our "State of the CIO" research, CIOs rate staff development dead last in terms of effectiveness and, consequently, in how often they offer entry-level training programs.

Yet three CIOs in three very different industries—LeFave, Doucette and Steve Jasinski of O'Reilly Auto Parts, a midmarket automobile parts distributor and retailer—see value in IT entry-level recruiting and training. These CIOs are fully aware that the benefits will not show up immediately on the bottom line. But they say that the money spent on these programs will help develop new staffers faster and give them a deeper business skill set, as well as elicit company loyalty.

Before we bestow a corporate humanitarian award to these CIOs for their service to recent college grads, however, it should be noted that LeFave and Doucette are among the many CIOs who outsource a ton of IT entry-level jobs. "I'm not trying to portray myself as Mother Teresa," says LeFave, who has billion-dollar outsourcing deals for billing, customer care, data center and help desk operations, but "we do have a degree of social responsibility in all this."

Doucette outsources billions of dollars worth of infrastructure support and application development for UTC's operating companies. (To read about his hard-won lessons on outsourcing, see "Inside Outsourcing in India" at *www.cio.com/061505*.) But he emphasizes that there are critical functions—such as business analysis, architecture, key programmers and project management—that he'll always keep in-house. And that's precisely where he schools his young apprentices. "We provide them with as much exposure to business processes, systems and leadership as they can handle," Doucette says. "And with the program, we guarantee our success."

UNITED TECHNOLOGIES: Business Acceleration for Fast-Trackers

United Technologies' three-year-old program, called the IT Leadership Program (ITLP), is all about how new IT employees can adapt to and succeed in the varying business cultures of UTC's seven operating companies: Carrier, Hamilton Sundstrand, Otis, Pratt & Whitney, Sikorsky, UTC Fire & Security and UTC Power, which together recorded $37 billion of revenue in 2004. ITLP associates work in three units for successive nine-month stints. They are challenged in skill sets such as system architecture, contract management, project management, business analysis and leadership. "We're trying to give them five years' experience in 27 months," Doucette says. "All assignments are stretch assignments where they can accomplish something."

Doucette modeled ITLP after a training program in the corporate finance group. His first class of six associates, each of whom applied for the program and went through multiple rounds of interviews, is scheduled to graduate in September. "You start off a little green," says Rahul Krishnan, a member of the first class. "But going through the program has been a growing experience, because every rotation is different." An action committee, led by Manager of IT Leadership Development Evelyn Bunnell, determines each rotation, basing it on the associate's interests and skills as well as the IT needs of the business units. The sponsoring business units fund each associate's nine-month stay.

During his first rotation at Pratt & Whitney, Krishnan focused on execution, working on projects that were near completion or ones that had been done before. On his second rotation at Carrier, he was given a tougher assignment—a new project without much to go by. "You're starting with a blank sheet of paper," Krishnan says of his project. In the third rotation, at Sikorsky, he is now focused more on the intricacies and complexities of project management. "It's challenging because of the fact that everything I'm doing is new," he says.

During the first rotation, Krishnan worked on a team that had been successful in the past and that had a good system in place for implementing IT projects. "Things moved very smoothly," he says. On the second rotation, Krishnan was faced with members of a Carrier business group "who weren't necessarily too keen on working with IT on a project that hadn't been done before," he says. "It was not the same IT infrastructure as Pratt & Whitney, and [the project] took longer to get off the ground."

ENTRY-LEVEL OPTIONS

THREE CIOs WITH DIFFERENT NEEDS AND APPROACHES

	UNITED TECHNOLOGIES	NEXTEL	O'REILLY AUTO PARTS
CIO	**John Doucette**	**Dick LeFave**	**Steve Jasinski**
Value proposition	Train new hires in critical functions that can't be outsourced, such as business analysis and architecture	Develop IT "bench strength"; improve company morale	Secure IT talent in a competitive market
Participants	Six each year since 2003, selected via applications and multiple interviews	17 new hires in the first year (2004)	Up to 15 college interns annually over the past decade
Program structure	27-month rotation with nine-month stints in three different business units	Six-week program split into two parts, IT operations and business function	Two-year internships with a 90-day test period
Training emphasis	Stretch assignments in project management, business analysis and architecture; training in leadership and teamwork	Course on IT fundamentals followed by placement in an IT department; presentations from every business function	Hands-on work as a programmer accompanied by one-on-one guidance
Management feedback	Performance appraisals; trainee presentations to the company's CIO council	Regular meetings with mentors and instructors; meals with company executives	Mentoring from senior staffers; interns work toward benchmarks

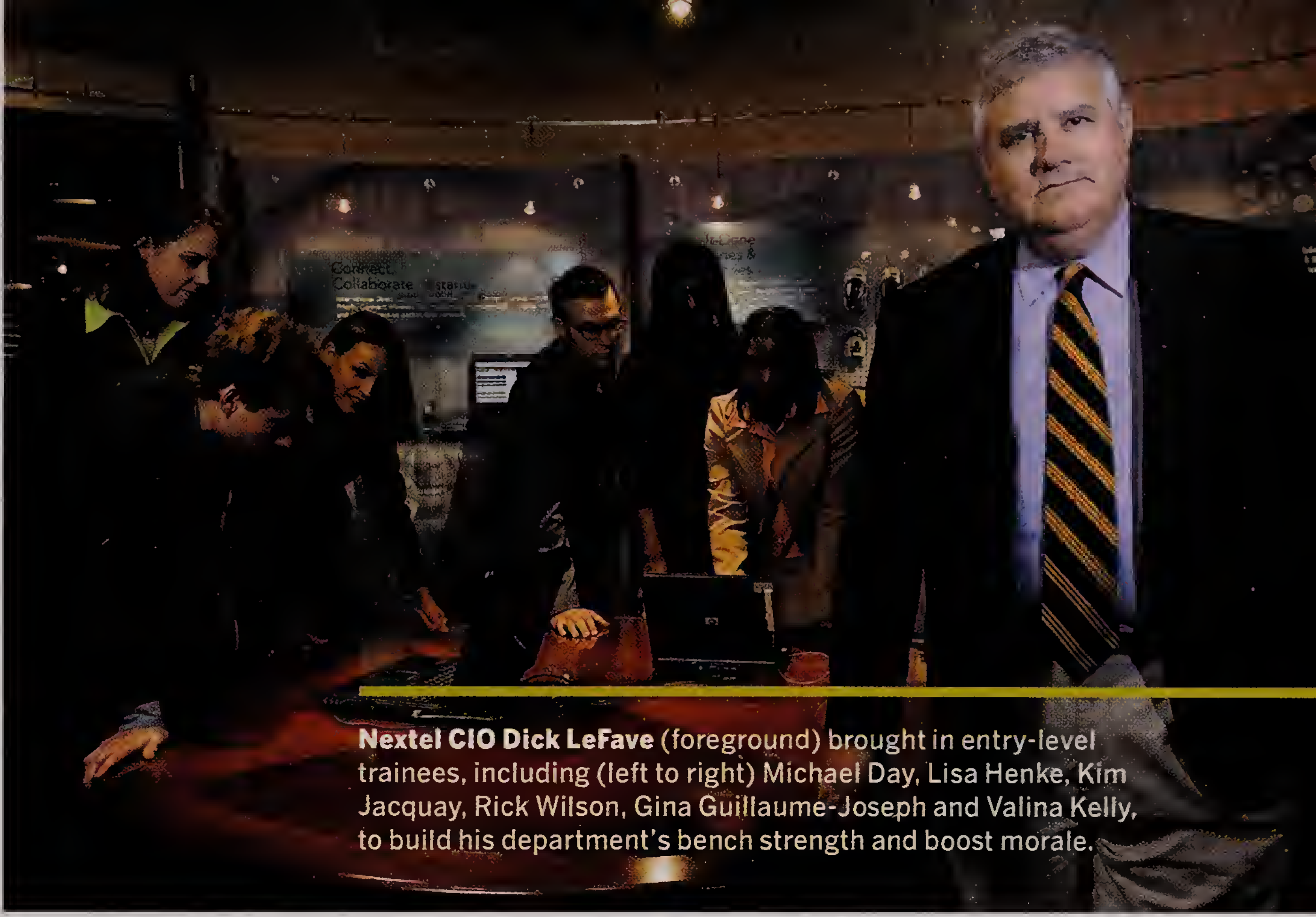
Nextel CIO Dick LeFave (foreground) brought in entry-level trainees, including (left to right) Michael Day, Lisa Henke, Kim Jacquay, Rick Wilson, Gina Guillaume-Joseph and Valina Kelly, to build his department's bench strength and boost morale.

PHOTO BY DANUTA OTFINOWSKI

That's exactly the kind of challenge that Doucette and Bunnell were hoping the associates would face. "It shows them what a good leader is," Bunnell says. "Can you get things done without getting people up in arms? Can you adapt to the new environment and engage that new skill set?"

Krishnan felt pretty low when his Carrier rotation ended because he thought he hadn't measured up to the challenges. But when he debriefed with his Carrier manager and Bunnell after the rotation, they asked him to consider how far he had come in nine months. He realized that the going had sometimes been tough and frustrating, but the lessons were there. In addition to a lot of how-tos of project management, Krishnan says he learned much about people management—the importance of first impressions, humility and a professional manner. "If I learn at this kind of rate, what could I learn in nine more months?" he says. "I had to experience that [challenge] firsthand."

Rashaun Ashley, a member of the 2005 ITLP class, found the stretch assignments both challenging and bracing. "They let you stand on your own and see what you can do in a stressful initiative," he says. But a big dose of humility comes with the independence. "You also have to learn when a situation is out of control and find someone who can help you fix it and put it back in perspective," he says.

Entry-level employees marked as high potential can experience resentment from low-level IT staffers who are not in the program. Ashley says that during his last assignment, he heard other employees saying, "Here, Mr. ITLP, you can take care of it." (UTC has hired two entry-level employees per year, on average, who are not part of the ITLP program.) Though not an intended part of the process, how the candidates deal with assimilation into business groups is a valuable part of the maturation process, Bunnell says. "What we're trying to do is take an entry-level person and make him into a position much higher," she says. "So we need to be sensitive to those employees [not in the program] who are wondering, Why can't this be happening to me?"

On the flip side, Bunnell says she has had to make sure ITLP associates aren't displaying any entitlement. In a recent case, one ITLP member dropped Doucette's name during a sticky situation with a high-level employee. Bunnell used the incident as an occasion to talk with all the trainees about the need to exercise politics in the workplace. "We have to prepare them to be humble," she says.

For their part, ITLPers cite visibility with executives as one of the prime benefits of the program. "When they're talking about their vision, you get a sense of the strategy and how you're going to deal with the business," says Krishnan. "You lose that at the microscopic level." Because of the attention that management gives to his rotations, Ashley says, "I'm not here without a goal, without a scope."

Looking back on the first class, Doucette acknowledges that the goals of the program were aggressive. "We wanted to push them but also give them enough support," he says. The support comes in many forms. The business sponsor keeps an eye on the associate and gives him a performance appraisal at the end of the rotation, with input from the ITLP action committee; the associate also receives a recommendation for his next rotation. "The associates are very interested in feedback," Bunnell says. "At the end of nine months, everyone's anxious to get into another position that they want." All of the ITLPers also meet monthly to talk about issues aside from their current job, and they each have various mentors from the action committee if they prefer more private discussions.

After associates finish a rotation, they have to give a presentation to UTC's CIO Council (made up of the operating companies' CIOs) about their experiences. "It's amazing to watch how much these kids grow," Doucette says. If the ITLP graduates eventually use what they've learned to leave IT and move into other departments in the company—such as sales, marketing or finance—so much the better for UTC. "Everyone doesn't have to be a CIO," Doucette says.

In the end, the ITLP program ends up being like a blend of *The Real World*, *Survivor* and *The Apprentice*. "When we started out, we were six people alone on an island, because everybody hadn't heard about [the program]," Krishnan says of the group. "And sometimes, it was a little uncomfortable."

Now, says a proud Doucette, "Everyone's battling to get [ITLP associates] into their business. They've brought a whole new life to the organization."

NEXTEL:
A Morale Boost from the Talent Bench

A couple of years ago, Nextel's LeFave looked into the future of his IT department, and he didn't like what he saw. "What became very apparent is that there were no means by which we were going to develop a bench strength for the future," he recalls. So in summer 2004, he brought in 17 entry-level staffers to kick off a new training program at the $11 billion company. The new hires were unformed computer science majors who could fit in right away at the scrappy company. "We're pushing [employees] pretty hard, and we wanted young people," LeFave says. "The training program would give them a foundation and expose them to the various pieces of the business."

He also hoped the plan would infuse some excitement and raise the morale among his staff of 1,000, which had seen their number shrink significantly after long-term outsourcing deals were inked between 2000 and 2002. (For profiles of the people involved, see "Life After Outsourcing," *www.cio.com/061505.*) "With outsourcing, there's a degree of uncertainty among the rest of the staff," LeFave says. When he announced the training program to the rest of the staff, "the morale felt good because we were looking toward the future."

The six-week training program consists of an orientation in two parts: practical IT operations and the actual functioning of the business. To start, newbies take a course on IT fundamentals. "Some of it could be redundant for some of them, but it levels the playing field," LeFave says. There are frequent meetings with instructors, program directors and mentors. The participants also attend presentations given by vice presidents from every Nextel department and have lunches and dinners with the VPs, CEO, CFO and head of engineering.

"You learn about Nextel on the whole but about the telecom industry as well," says Kim Jacquay, a member of the first class. "You also see what Nextel is planning and how we could impact that." Pairing the trainees with mentors wasn't a problem according to LeFave. "We had people lined up to do that," he says. Mentors received HR training so that they could work one-on-one with the trainees.

On the operations side, the participants try out departments that they're interested in. Some work in application maintenance and support, some in the infrastructure group, others on Sarbanes-Oxley requirements. "We try to give them a real cross section of experience," LeFave says.

Jacquay believes the breadth of training has given her career an early boost. "If you're not part of a college hire program [such as Nextel's], you're just thrown into a position," she says. "I don't feel entry-level," Jacquay says. "I can't believe what I've learned [since] being here." The training program has allowed her to link academic learning with real-world application. For example, in college she learned how to write a SQL statement. In the training program, she saw how that skill fits into telecom networks and how calls are made and routed through the different parts of Nextel's networks.

Jacquay found the assignments incredibly challenging. "There were plenty of days when I wasn't exactly sure what I was doing or what steps I needed to do to get [the project] accomplished," she says. Conversations with her mentor and senior Nextel employees aided her learning. "The most important part has been to ask questions," she says. "In order to learn, you have to be willing to put in the effort, picking people's brains."

After the program ends, trainees get permanent positions. Jacquay is now an IT business analyst, working on the revenue-generating side of Nextel's project management office (PMO). "I'm working on requirements for applications that enable sales forces to get their jobs done," she says. "In the PMO, you get an overall picture of application software, and you're not just siloed into one specific aspect."

Despite the current onus to reduce labor costs, LeFave feels a strong need for more CIOs to rekindle the apprentice and journeyman IT roles that helped him get his career started. "You have to have someone who can share the experiences of success and failure with the next group," he says. LeFave says the cost to set up and run the training program varies, hovering around $50,000. But he is sold on the greater good. "This is the one program that I'll never

NO ENTRY

WHY ONE CIO NO LONGER HIRES ENTRY-LEVEL STAFFERS

IN 1978, BETTE WALKER SNAGGED her first IT job in the town of Bedford, N.H., as a programmer trainee, fresh out of the University of New Hampshire. "I guess I believed that 'opportunity' in IT was to sit within the four walls and just write code," she recalls.

From where she sits now, presiding over IT for Delphi, a $27 billion global manufacturer based in the heart of Michigan's automotive mecca, Walker can easily reel off the differences between IT's past and present. The velocity of business has changed; the business community is far more literate; the applications and tools are very different. She could go on.

One change she doesn't mention is the declining need for the Bette Walker of 1978.

She admits that she has hired fewer than 20 entry-level staffers during the past five years. Many of the unhired are, essentially, mirror images of herself back in Bedford, N.H.: fresh-out-of-college programmers who just want to write code yet lack any real-world or business experience. Why she doesn't hire at the entry level is simple: 80 percent of the IT department is outsourced, and the small 20 percent of in-house staff attempting to do everything else doesn't leave much time to bring in newbies who need hand-holding. "There are other companies that know how to do it well," she says. "I'm not going to go out recruiting and building people. It's just not where we want to spend our energy."

But she's quick to point out that Delphi's massive outsourcing contracts create demand for lots of entry-level hires in those companies. "There's a tremendous opportunity in those companies that I buy services from," Walker says. "We are dependent upon the health of the entry-level population and resupply in our service companies." *–T.W.*

forget provided more of an inspiration and motivation to the organization," he says. "The motivation and the morale is 10 times more important than the economics."

O'REILLY AUTO PARTS:
Talent Pipeline in a Tight Market

At O'Reilly Auto Parts, Jasinski doesn't wait for entry-level IT programmers to graduate from college. Over the past 10 years, the vice president of IS at the $1.7 billion auto parts retailer has forged a strong relationship with local colleges in the Springfield, Mo., area. He goes after college juniors and brings them in as paid interns.

There is both the "greater good" aspect to Jasinski's efforts as well as an effort to secure talent in an area where talent is hard to come by. "The programming resources are fought for by primarily the same companies in the area," he says. Southwest Missouri State is the largest local university, and that's where Jasinski gets most of his interns from.

Lots of companies hire interns, but Jasinski's program is exceptional as an entry-level training ground for what he hopes are his future IT programmers. He offers interns real-world experience and gives them a means to apply what they're learning in college. "We're not looking to teach them; colleges do that," he says. "But we want to retool them with our processes and the programming language we use." During a 90-day probationary period, mentors school the interns in the IT department's software and in O'Reilly's editor and change management processes. "They live, eat and breathe as an O'Reilly programmer," Jasinski says.

Senior staffers act as mentors to the interns as well as eyes and ears for Jasinski. The interns progress through checkpoints, working at standardized programs and test projects that Jasinski has benchmarked with previous candidates. "We know what they should be capable of doing," he says. "Can they take and create a program to perform the tasks they were asked to do?"

Informally, much of the benefit for the interns lies in being able to soak up knowledge about O'Reilly's software, projects and culture, through one-on-one interactive work with senior analysts and other team members and what Jasinski terms "osmosis time." He says programmers are happy to act as mentors, because the interns can take some of the lower-level work off the programmers' hands, which allows them to work on higher-return projects.

Interns with the right aptitude and ambition—and who can wear the many hats that his small shop needs—are able to move more quickly through the program. "As interns prove themselves, they are challenged with more difficult projects and roles," Jasinski says. And when a permanent position becomes available, Jasinski knows whether he has the right person for the job.

Jasinski has had as many as 15 interns at one time and sometimes none; it all depends on the changing business cycles and who's available. Right now, he has four interns among 52 IT staffers. Not all make it through the program. "For every four into the program, we'll lose one," Jasinski says. "But more often, we're right [about a candidate]." At times, nearly 40 percent of his full-time IT staffers are folks who began as interns.

One challenge of the O'Reilly program is when a two-year intern gets the "bright lights, big city" bug upon graduation. "The risk is training someone and creating a marketable college graduate who takes a job somewhere else," Jasinski says. During the interview process, he's forthright in asking potential interns about their postgraduation desires. He looks at where they're from and where they're more than likely to go after college. Interestingly, Jasinski says his first entry-level job and subsequent move to another company is precisely the problem that he's trying to combat with his training plan.

Unlike UTC's Doucette and Nextel's LeFave, though, Jasinski does not send any IT work offshore—and has little or no plans to do so. "There's value in having business knowledge within our four walls," he says. "And there's enough going on in technology that there's still a significant amount of people interested in these positions."

Although their approaches to the entry level differ, these three CIOs say they'll continue looking to new employees for the same set of reasons: to infuse their departments with talent, energy and fresh thinking. Their collective hope is that more CIOs will follow suit, for the good of their businesses and for the greater good. CIO

Staff Writer Thomas Wailgum (*twailgum@cio.com*) wrote about UPS's succession planning program in the May 1 issue.

The internship program at **O'Reilly Auto Parts** has provided **VP of IS Steve Jasinski** (far left) with as much as 40% of his permanent staff. Four of the current crop of interns (left to right): Paul Southard, Jonathan Keeney, Nick Ramsey and Shawn Mitchell.

PHOTO BY DIANA J. HICKS

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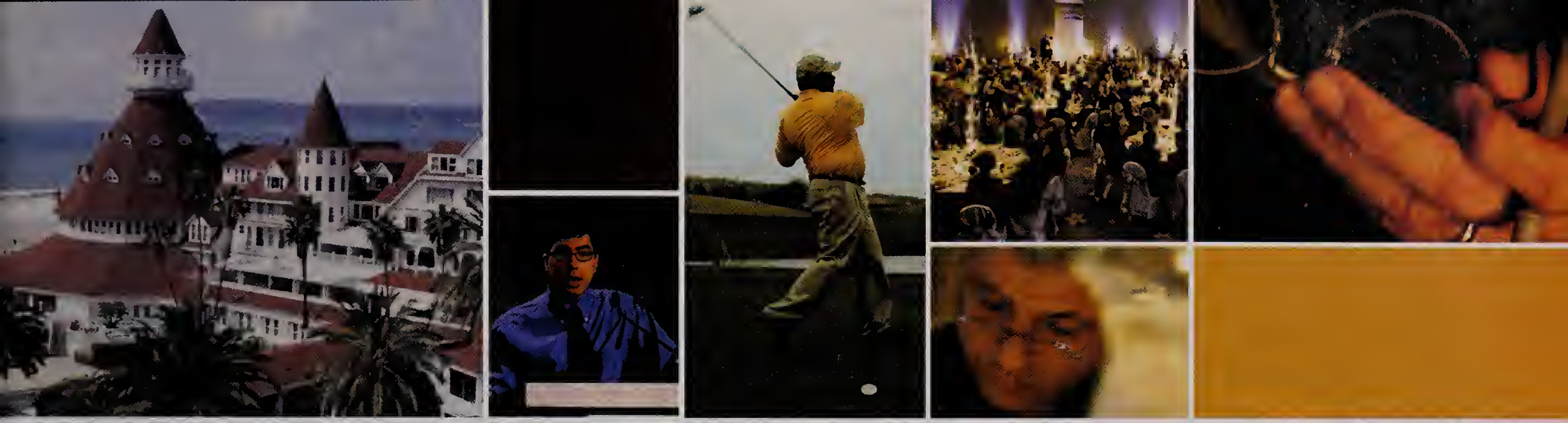

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Are your employees and customers looking for answers? Enterprise search vendors promise to help you help them.

Seek and Ye Shall (Hopefully) Find

BY JOHN EDWARDS

ENTERPRISE SEARCH | You plan to do business in Minnesota. You need to search the state's records for soil pollution rules. Good luck. Type the words "soil pollution regulations" into the search box on the state's North Star portal, and you'll find more than 70,000 results, including a seemingly endless stream of outdated government studies, arcane court cases and links to several agency databases.

But wait, a column on the browser's left side promises hope. There, you see a list of "related topics," including a "natural resources>pollution>soil pollution" heading. You click on it and—Eureka!—only 97 results, including connections to specific, relevant agency fact sheets.

Welcome to the new world of search technology, where results are measured not only in terms of information depth, but also by real-world relevance. "We now have the power to build a topic structure, including topics, subtopics and browsable subcategories," says Eileen Quam, information architect for the Minnesota Office of Technology in St. Paul. "People can walk their way through our information."

For enterprises with rapidly expanding websites and portals, the need to make unstruc-

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tured information—that is, data that hasn't been formatted, tagged or indexed for fast retrieval—more manageable is undeniable. "It's a well-known statistic in the search business that 80 percent of corporate data is unstructured versus 20 percent that's contained in databases and ERP systems," says Tammy Alairys, a partner with business and technology consultancy Accenture. Alairys leads Accenture's information management practice, which provides consulting services on enterprise content management (ECM), business intelligence (BI), and search and collaboration technologies.

> "People find it very easy to create documents and content using computers, but they have a much harder time finding it later."
>
> –Hadley Reynolds, director of research, Delphi Group

It's the promise of getting that 80 percent of data into the hands of people who can put it to good use that's driving a growing interest in search technology. "There's an awful lot of information sitting out there that is very difficult to extract value from," says Alairys. For CIOs, search technology provides a fast and efficient way (and sometimes the only way) to locate and retrieve vital intelligence. Yet, as more enterprises turn to search tools, CIOs are discovering that the technology also comes with strings attached, particularly in the areas of usability and security.

With search engines becoming increasingly powerful and useful, search engine companies are discovering the truth behind the old axiom, "Knowledge is power, and power is money." That's why the search engine business is suddenly red hot. Google is making serious enterprise moves. And an array of tech vendors—including giants such as IBM, Microsoft and Yahoo, along with smaller players such as Endeca Technologies, Verity, Vivisimo and X1 Technologies—are all hoping to snag at least a snippet of Google's success with their own search products. Heightened competition has also encouraged the companies to give away software, such as desktop search tools, in an effort to bring in more customers.

But despite the flurry of activity, Forrester's Ramos believes that the enterprise search market stands at a crossroads, leading to consolidation with either ECM or BI software. "Its role in ECM is to help organize and retrieve the content under management," observes Ramos. "In BI, it is the logical equivalent to data mining for text." Ramos feels that "search vendors must pick a path and strike the right deals or partnerships to move forward." For CIOs, consolidation promises to ease costs and simplify deployment and management by integrating search technology into a larger product.

Blame It on the Web

Why the heightened stature of search? The democratizing power of the Web has encouraged enterprises to place vast amounts of unstructured online information into the hands of employees, customers and others. But this development comes as a double-edged sword. "People find it very easy to create documents and content using computers, but they have a much harder time finding it later," says Hadley Reynolds, director of research for Delphi Group. (Of course, you could always control it all with a digital asset management system such as the one used by public TV station WGBH. See "From Tapes to Bits," Page 58. But such systems are costly, complicated and ill-suited for day-to-day content such as e-mail messages.)

Basic search engines have no trouble finding information, but they aren't so good at

Turning Search Technology on Its Head

Jim Jansen thinks that most of today's search engines have things backward. The assistant professor of information sciences and technology at Penn State University in University Park, Pa., has developed a search engine assist system that actively helps people find the information they need.

The new approach is the direct opposite of conventional search technologies, which require people to actively look for guidance (if any is offered) somewhere on the browser screen. Jansen's Agent Improved Information Retrieval System (AI2RS) uses "implicit feedback" as revealed through the searcher's query patterns. Incorporated into a browser, the software monitors the user's search actions and automatically provides suggestions for structuring and refining queries.

Jansen says AI2RS shouldn't be confused with "Clippy," the much-derided Microsoft Office assistant that many people believe was designed with the sole purpose of irritating users. "We tried to learn from this experience," he says. Jansen notes that he and his co-researchers studied users' search habits and designed a system that interjects only when it knows the user is amenable to receiving assistance. "The goal is to help, not annoy," he says.

And help is what beleaguered Web searchers desperately need. "Research shows that 50 percent of all Web search results retrieved are not relevant," says Jansen. "This technology provides a 20 percent performance increase."

Jansen hopes to follow in the footsteps of earlier university-based search technology pioneers, such as Google (which began life at Stanford University) and Vivisimo (a Carnegie Mellon University spin-off). "We're definitely considering this technology's commercial potential," he says.

–J.E.

Approximately **85% of Canadian Internet users** conduct at least one search using the top engines each month, **compared with 73% in the United States.**

SOURCE: ComScore Networks

placing results into context. That's why a simple search for "anthrax" will uncover links about vaccines, homeland security and a heavy metal band. And searchers are increasingly more demanding. "If people don't find value in a search technology, they stop using it pretty quickly," says Alairys. To attract and retain satisfied searchers and enterprises, vendors are jockeying to prove that their tools go beyond simply matching keywords to links. "It's not good enough to give someone a search result," says Laura Ramos, a search technology analyst with Forrester Research. "You want to guide them through the self-service process."

Follow the Leader

Search engine developers rely on secret mixtures of algorithms, user interfaces and other technologies to create unique tools that generate fast, relevant searches. Verity, the company that supplies the Minnesota Office of Technology's search software, aims to guide searchers with an add-on feature, the Content Classification Engine (CCE), that can be built into its Ultraseek search platform.

The CCE tightly integrates searching and browsing functions. While viewing topics, users can conduct focused queries by searching within a subject area. "The search engine populates specific themes with pages from all the different agencies," says Minnesota Office of Technology's Quam. That means if a user types in "disabled education," the individual isn't simply directed to documents pulled from the Department of Education's website, but to relevant content on all state databases.

Search engine access controls aren't foolproof, and carelessness and misunderstandings can lead to potentially disastrous security gaps.

XML and Security

Web services, in the form of XML, can play a big role in streamlining and improving the accuracy of user searches. XML allows document designers to classify discrete pieces of data, essentially turning unstructured documents into structured documents. The advantage of structured data is that it lets users fine-tune their searches using concepts instead of keywords or phrases. For instance, it is helpful to limit a search for Jaguar to the category transportation>autos>U.K., rather than mammals>cats. And once the user sees a result, he can use classifiers to browse within a category or subcategory for other results that may be conceptually similar, such as X-Type or XKE, even if they don't contain the keyword Jaguar.

But while XML promises to help untangle online information, it's no magic elixir. That's because the technology has yet to be widely applied. "Industry must publish more content with XML structure so that engines can then extract it and find it," says Forrester's Ramos. Therefore, while an enterprise can ensure better searches of in-house databases with XML-tagged documents, external searching remains problematic.

On the other hand, there is much information—such as trade secrets and employee payroll records—that enterprises don't want everyone to access. Yet whenever enterprise databases are made public, there's always the chance that critical information can inadvertently slip out. Fortunately, virtually all enterprise search engine systems have controls that grant or restrict information access based on the user's name, title, division, location and other key criteria.

Keep Up Online

Technology Editor Christopher Lindquist scours the **best of what's on the Web** when it comes to emerging technology. Read his blog, **TECH LINKLETTER**, at **www.cio.com**.

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Still, access controls aren't foolproof, and carelessness and misunderstandings can lead to potentially disastrous security gaps. Google's desktop search tool, for instance, was found last year to have a serious security flaw (which was quickly patched). Ultimately, it's up to the CIO to establish firm guidelines on access controls and the type of search software that may be installed on enterprise systems. "There are a lot of [inappropriate] things that can be done if documents are not stored in the right place or if they're not saved with the appropriate security attributes," says Alairys.

Multiple Layers

As snowballing information makes it increasingly difficult to conduct useful searches, a consensus is gradually forming that it may be impossible for any single vendor to provide a search solution that meets the needs of all enterprises and all searchers in all situations. A layered approach, leveraging the strengths of various search tools to build an aggregate solution, may be the best approach for enterprises that need to balance the search requirements of employees, customers, business partners and others. "The whole idea of search being an enterprise utility, like water coming out of the tap, is very much still a myth," says Delphi's Reynolds.

America Online, for example, bases its search feature on Google but enhances it with Vivisimo technology, which organizes results into categories to make them easier to browse. Many enterprises also utilize multiple search engines, such as law firms that give their staff attorneys access to Google for general searches and Lexis for prowling through legal citations. Yet deploying and managing several engines can lead to greater up-front and maintenance costs, as well as possible technology conflicts, if the engines aren't thoroughly tested under various real-world conditions. Many enterprises use Web services at the data level and a portal at the user interface level to tie engines together for different user search scenarios.

As search technology improves, the need to combine individual search tools may diminish. Artificial intelligence-based enhancements, such as natural language interfaces, will eventually enable users to ask questions like, "How old will President George W. Bush be on Nov. 21, 2006?" and receive a precise answer instead of links. (The president, incidentally, will be 60 years old on that date.)

Search researchers have been promising "semantic searches" for years. The World Wide Web Consortium has an entire project dedicated to the effort (*www.w3.org/2001/sw*), but the complex technology has so far eluded the best efforts of the world's most skilled search experts and remains years away from fruition. For now, enterprises are simply wondering how to use the tools at hand to help people find the information they need. "The problem is," says Reynolds, "they can't turn to a search engine to find the answer."

John Edwards is a freelance writer based in Arizona. He can be reached at *john@john-edwards.com*.

UNDER DEVELOPMENT

Easy Integration Dance

INTEGRATION | The siren call of "dead simple integration" has lured legions of software vendors, venture capitalists and CIOs into the icy depths in the last couple decades, but past failure hasn't stopped adventurous souls from dreaming of future success.

One of the latest attempts is an MIT technology project called DOME, which has been licensed to startup software company Tambora. Tambora plans to commercialize the integration platform, which it has renamed BreadnButter, in hopes of bringing super-simple integration to the masses. The project started when MIT began working with Ford to create a way to ease data sharing and collaboration among employees who were designing new doors and windows for automobiles. Ultimately, they wanted a technology that would allow the collaborators themselves to quickly and easily integrate data that included some 3,000 parameters, rather than involving the IT department.

After seven years and $4 million, a rollout is now happening inside Ford. But Bruce Anderson, acting CEO at Tambora, says that the technology is far more generally applicable and could be used to integrate many different types of data and applications. As proof, Tambora has already launched a demo site (*www.tamborasoftware.com*) in which users can quickly integrate Excel spreadsheets that update in real-time whenever someone edits cells. The company announced plans to launch a hosted spreadsheet linking service in May, with additional features—such as the capability to run a Tambora integration server behind a corporate firewall, and removal of the need to upload spreadsheets to the server—coming later this year. Tambora will also offer a number of prepackaged, preintegrated spreadsheets that will be available free of charge on the site, with customization available for a fee. Anderson also says that spreadsheets are only the tip of the iceberg for Tambora; the company has plans to introduce other BreadnButter-based integration options at some point in the future.

–Christopher Lindquist

The ROI of Open Source

Is open source cheaper than commercial? It all depends on the job at hand.

BY BERNARD GOLDEN

By using open source instead of a commercial alternative, ABB estimates it can save $1.1 million in just its first five factories.

SOFTWARE | The ROI of open-source software is a contentious issue. Several recent studies, conducted by Yankee Group, JupiterResearch, Forrester Research and others, have focused on the ROI of upgrading a Windows installation versus switching to Linux and have concluded that it is less expensive to stick with Windows. But the reports miss a critical point: Switching from Windows to Linux is the worst-case ROI scenario. After all, the new platform requires training and perhaps hiring new personnel—always expensive propositions—versus merely paying for licenses.

A more important question is, can open source generate real ROI elsewhere? Yes. Oregon State University (OSU), for example, has websites that visitors need to search, so the school bought a Google appliance for about $125,000 per year. Two years later, OSU's IT department, aided by the Open Source Lab, replaced the appliance with an open-source search product called Nutch (license cost: $0). Nutch is not as easy to use as the Google software, so additional administration costs run to about $10,000 yearly. The overall five-year payback, however, even when you consider additional hardware and engineering time, still produced an internal rate of return of 2,300 percent.

As they say in the weight loss commercials, these results may not be typical. But other companies have also found success. ABB, for instance, is an $18 billion Swiss industrial company. When its Power Technologies Products (PTPR) business needed to integrate new features into its software infrastructure, the PTPR Software Factory Group constructed a J2EE-based "Integration Framework" using a popular open-source tool called Jboss. By using open source, ABB estimates it can save $1.1 million in just its first five factories, with further savings to come as it rolls out to more of PTPR's 52 locations. Interestingly, the Integration Framework runs on Windows and uses SQL Server as its data store, belying the perception that moving to open source is a massive rip-and-replace operation.

The key to success is determining which projects make sense for open source. To get started, treat each product individually. Savvy organizations consider both commercial and open-source options for projects, and choose the right product for the given situation. Then make sure you evaluate using the proper time horizon. A single heads-up comparison between a commercial product and its open-source counterpart may not offer good open-source ROI, because the costs of training and switching can outweigh the cost of a commercial license. But if you extend the time horizon to the realistic life of the application, it may tip the balance toward open source. Finally, take the entire organization into account. While a specific open-source project may not offer great ROI, the cost benefits of pioneer applications often materialize downstream in later projects that are able to adopt the open-source package. Even if you purchase enterprise licenses for your commercial products so that your marginal cost for a new application is effectively zero, keep in mind that someday, when those licenses are up for renewal, that marginal cost may be much higher.

This column hasn't touched on any of the other reasons organizations use open source: flexibility, reduced operational costs through not needing to track license compliance, and greater control of the organization's software stack, since there are no forced upgrades or product end-of-life announcements. Because ROI is so tangible, however, it is critical to address it explicitly. Just keep in mind that there is no single answer; you need to find the right choice for your organization and your application.

Bernard Golden is CEO of Navica, an open-source consultancy, and is the author of *Succeeding with Open Source* (Addison-Wesley, 2004), and the forthcoming *Open Source Best Practices*. Contact him at *bgolden@navicasoft.com*.

Missed Opportunities

CEOs need to better understand the power of IT

PHOTO BY WEBB CHAPPELL

David Moschella, global research director for the Leading Edge Forum, polled 200 business executives and 200 CIOs with this question: What is the greatest obstacle to implementing technology at your organization?

We liked the question so much we asked it on CIO.com, and lo and behold, both the Leading Edge Forum and *CIO* studies had the same finding: that the inability of the business side to take advantage of more powerful IT capabilities was public enemy number one. While CIOs have tended their tech gardens as "intelligent caretakers," according to GM Group Vice President and CIO Ralph Szygenda, intent on squeezing cost out of the business and becoming compliant, the tech industry all around them has been busy creating incredibly powerful technologies that can truly transform a business. If only the CEO would ask.

I was reflecting on the power of technology during a recent business trip to Europe, my first venture to that continent since September 2001. Before leaving the house, I remembered I had not made a copy of the trip itinerary for my wife. With no time to print it, I booted up my notebook in the kitchen and wirelessly transmitted it to the desktop computer in the study.

Eight hours later, I landed in Germany and powered on my converged e-mail, phone and Web-enabled PDA, not expecting to receive the mail I missed in the overnight flight.

I was dead wrong. Within three minutes, I was totally synced with my company's e-mail server.

Later that same day, while sitting in a Barcelona café, I decided to call home using the PDA. No way this will work, I said to myself. Wrong again! Three rings later my wife greeted me to my total amazement!

I sat there in Barcelona thinking out loud to myself, How did they do that?

I really don't care. And neither should you. What you should care about is this: convincing your management that now is the time to start looking to this era of new, powerful technology to help transform and grow your business again.

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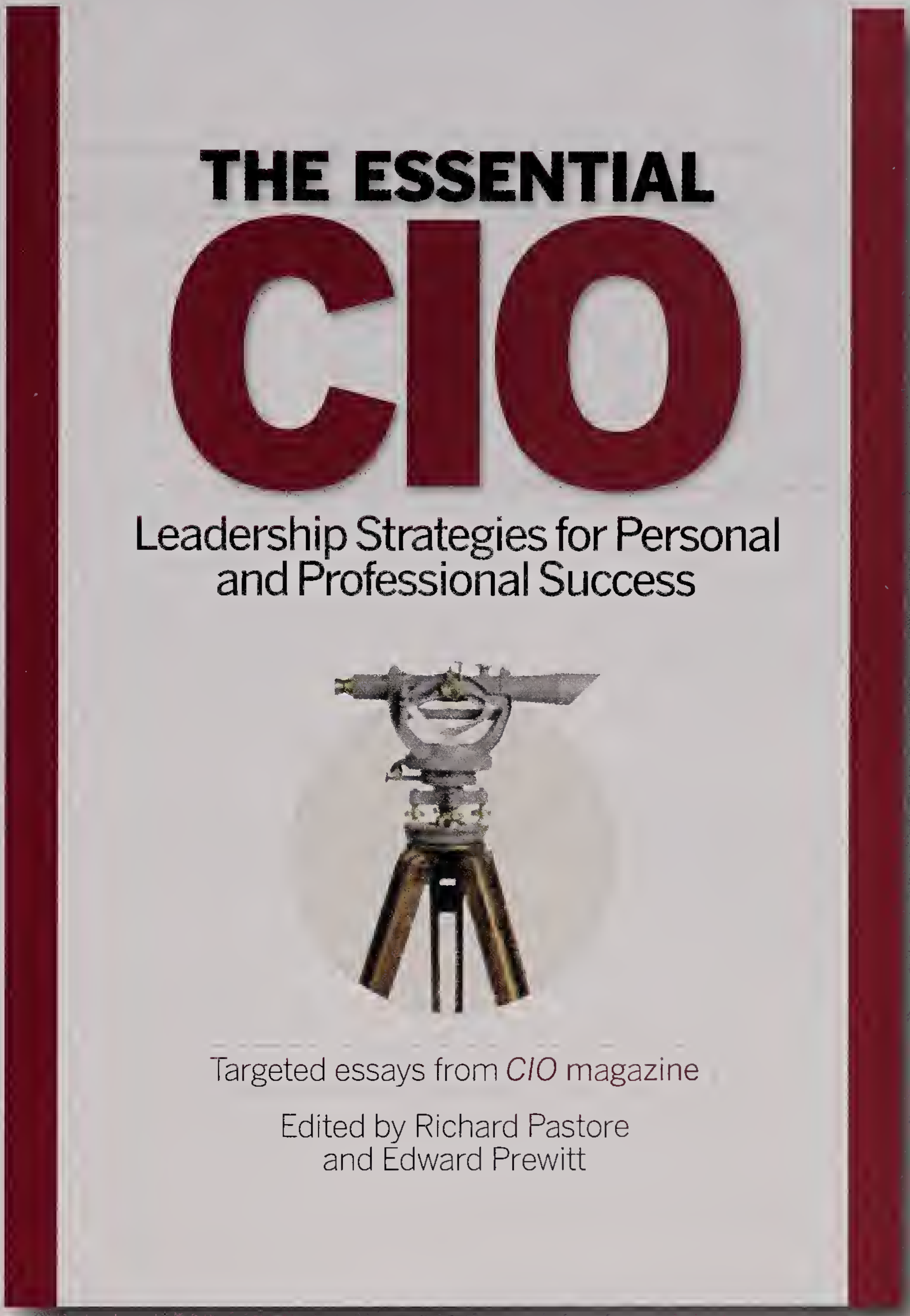

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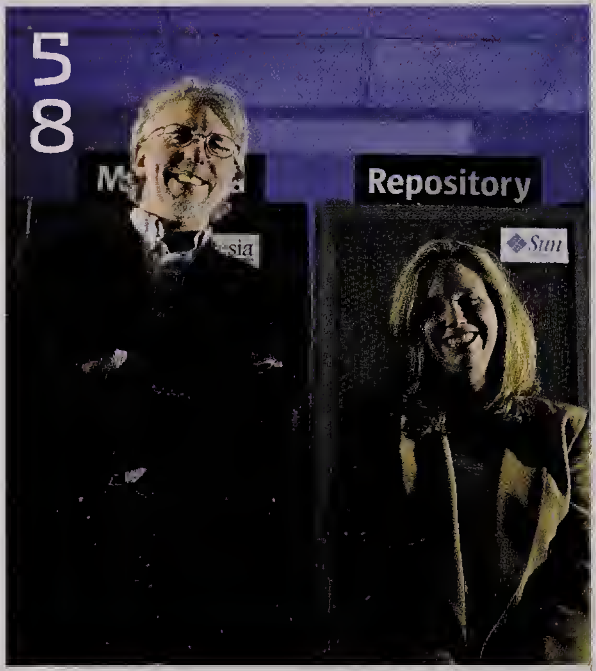

WGBH Chief Technologist **Dave MacCarn** and Director of IT **Amy Rantanen** spent years creating the functional specifications and requirements document for the station's DAM system.

58 | FROM TAPES TO BITS: DIGITAL ASSET MANAGEMENT

Many organizations struggle to keep track of logos, product photos, PowerPoint presentations, webcasts and press releases. And the inability to efficiently track such assets often leads to redundant work and higher costs. To solve the problem, some organizations are turning to digital asset management (DAM) systems, a combination of hardware and software that serves as a centralized catalog for audio, video, text and images. For 11 years, WGBH, the public television station in Boston, struggled to create a DAM system that integrated with the rest of its workflows and production technology. Today, WGBH has such a system—and an open, standards-based reference architecture for DAM—thanks to a partnership it forged with Sun Microsystems, OpenText and a variety of other vendors. Here's how they did it. *By Meridith Levinson*

42 | COVER STORY
WHY THE G-MEN AREN'T I.T. MEN

AFTER THE FBI WAS FORCED TO SCRAP its $170 million virtual case file (VCF) program because of delays, overruns and software incompatibility issues, agency officials realized they would need to change the FBI's culture to transform it into the kind of global intelligence service that can prevent high-tech crimes and terrorism. For years, FBI officials underestimated the role IT could play in that effort, and the agency also lacked basic IT management disciplines. The transformation task has been so frustrating that from 2002 to 2003, four CIOs came and went, and VCF ground through 10 program managers over its four-year history. But the latest CIO, Zalmai Azmi, has made progress. In February, Azmi got full IT budget authority. He's begun meeting regularly with a special agents advisory group to solicit advice on functions for the new system to replace VCF. He also has appointed a rotating special agent to his staff to inform him about what agents in the field want and need. *By Allan Holmes*

50 | WHO KNOWS WHOM, AND WHO KNOWS WHAT?

COMPANIES SUCH AS MARS, the packaged food giant, have long been frustrated by traditional knowledge management efforts and are looking for new ways to find out how knowledge flows through their organization. The org chart often doesn't tell the real stories about who's most influential and how employees are sharing critical information. Social network analysis (SNA), a process of mapping the links between workers, can provide a clearer picture of how employees and divisions are (or are not) working together, and can help companies identify their key people. SNA doesn't replace traditional KM tools such as databases and portals, but it can be a starting point to help CIOs set up mechanisms—such as communities of practice—so that the knowledge an enterprise possesses can be more effectively utilized. *By Susannah Patton*

66 | VALUE WAKE-UP CALL

MARRIOTT REDUCES ITS RISK by leaving ownership to others, making its money by managing and franchising. But owners and franchisees are demanding. They want to extract every last bit of ROI from their land and buildings. Consequently, they want their IT cheap. Marriott President and COO William Shaw explains in a "View from the Top" interview with Executive Editor Christopher Koch how he manages the cooperation among IT, the business and franchisees. For instance, Marriott provides its franchisees with metrics on the expected business value for every new IT tool it develops. By promoting this kind of transparency, Shaw says Marriott helps facilitate the franchisee's decision making and short-circuits hard feelings before they develop. *By Christopher Koch*

70 | THE KIDS ARE ALL RIGHT

TRAINING PROGRAMS for entry-level IT staff are increasingly rare in this age of outsourcing and cost control. In fact, CIOs rate staff development dead last in terms of ROI, according to *CIO* research. But we found three CIOs in three very different industries who see value in IT entry-level recruiting and training. Although fully aware that the benefits of their programs will not be reaped immediately, they say that their programs will speed up staff development, build the staff's business skills and breed loyalty to the company. Some of these CIOs outsource IT jobs, but there are critical positions they want to keep in-house, and they feel their apprentice programs will help them fill those jobs successfully. Find out how CIOs from United Technologies, Nextel and O'Reilly Auto Parts make these programs work. *By Thomas Wailgum*

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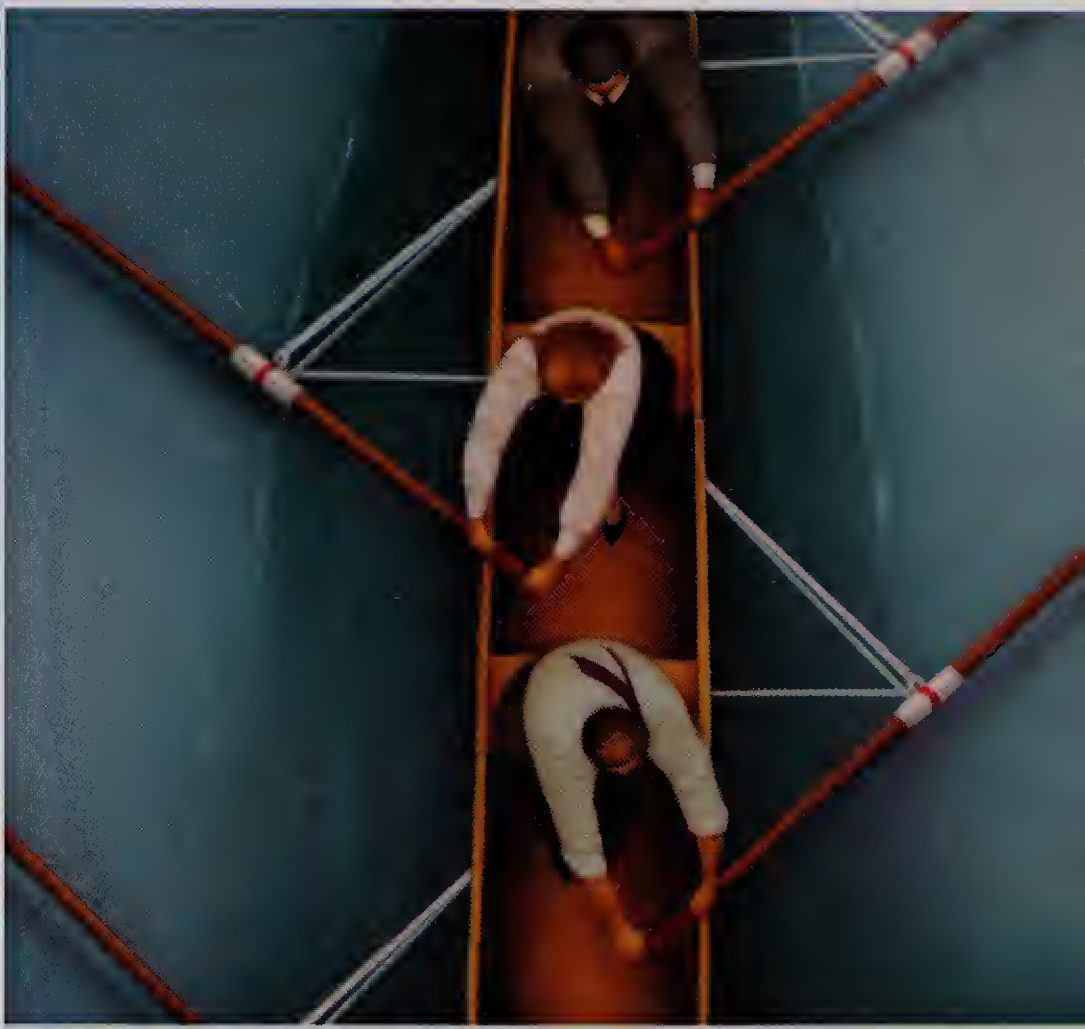

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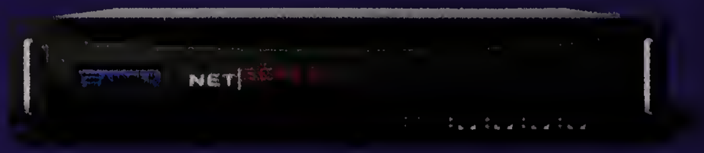

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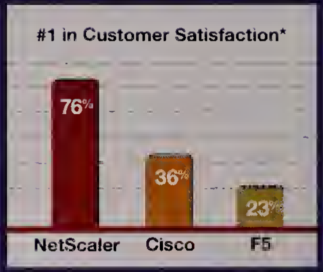

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